MONTANA OUTDOORS

WATER

HOW TWO MAJOR INDUSTRIES AFFECT THIS VITAL RESOURCE

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the cover

Right now, Montana is "rich" in aquatic wealth – miles of unpolluted streams and hundreds of clean lakes. But, will it always remain so? That's the topic of the cover story on page 22. Photos – front cover (background) by Bill Schneider; lower left by Ron Marcoux; lower right by Dave Wedum; back cover by Gus Wolfe.

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a livable environment for WILDLIFE is a quality environment for MAN

One of Montana's natural resources is very easy to take for granted—water. It has always been there, mostly pure and unpolluted, so it's assumed it always *will* be.

As a public agency charged with protection of fish and wildlife, we must question the accuracy of this assumption. First, Montana water isn't all pure and unpolluted. Many lakes and streams are far from "pure," and some are badly polluted. Secondly, the future for Montana water—probably the state's most valued natural resource—looks grim.

•Coal development promises to drastically reduce flows in eastern Montana. The coal and power companies tell us the water is all going to waste, and here's a chance for the state to use it. We wonder about the real motive behind that logic and contend that water left in the stream bed is not wasted.

•At this time of year, many landowners—public and private—are "working" on the stream that flows through their property. This often involves channelization, riprapping, wing dams for irrigation diversion and other stream alteration. Many of these lower water quality and all mean less fish habitat. And, the public still has no control over what the private landowner does to stream channels on his land.

•Plans exist to turn some of Montana's free-flowing streams of which only a few remain in the nation, into large artificial impoundments. Almost without exception, these dams cause long-term, environmental damage.

•This issue contains articles on how two major Montana industries—agriculture and logging—degrade the state's water and how this damage can be prevented.

•Subdivisions now border many streams that formerly were open to public use and providing vital wildlife habitat. Many of these developments allow sewage systems to drain into the same streams and lakes that originally brought a higher price for the lot. Laws prevent the degradation of water quality, but enforcement is difficult.

Many times, lower water quality can be avoided or, at the least, lessened considerably. But, it usually isn't. Why? There's a standard answer—economics. Cries to cease fish habitat destruction are easily lost in the clink of coins.

We think quality aquatic environments should be high priority in all decisions, regardless of the economics. In fact, some degradative actions, like stream channel alteration, are often poor economics in addition to causing environmental ruin.

I guess it all comes down to a matter of priorities Montanans must set and decisions we must make. Should we, as Montanans, always strive for the best possible aquatic environment—clean, pure, unpolluted water? Or, should we settle for something less?

Wes Woodgerd

Wes Woodgerd, Director
Department of Fish and Game

THERE'S NOTHING LIKE WILD HUCKLEBERRIES

. . .even if they aren't huckleberries

story by Cecelia Huls
photography by Craig Sharpe

WHEN THE NEW World opened to colonization, hundreds of English citizens left their homeland to start a new life. They brought with them English customs and language and English names and classifications.

Those early settlers yearned for home and did all they could to make this "barbaric" land a little more like England. Whenever they could, they gave English names to plants and trees, to animals and birds. And as the settlers moved West, they took those common English names with them.

Those names weren't bestowed on any scientific basis, but on appearances. It was a crude means of classification, but a system that stuck nevertheless and caused a great deal of confusion over the years. And huckleberries in Montana provide an excellent example.

Each fall hundreds of Montanans pick bucket after bucket of dark-colored berries. "Nothing like

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The recipes used in this article were taken from "Stalking the Wild Asparagus" by Euell Gibbons, David McKay Company, Inc., New York, 1962. Copyright © by Euell Gibbons. Reprinted with permission of the publisher.

HUCKLEBERRIES continued

wild huckleberries," they say as they head for home and some mouth-watering dishes.

But the berries aren't huckleberries; no "true" huckleberries grow in Montana. In fact, none thrive west of Minnesota. The true huckleberry belongs to the genus *Gaylussacia*. The berries picked in Montana as huckleberries are actually members of the genus *Vaccinium*, or blueberries. They are a variant of the blueberries grown commercially in the West, usually in the Cascade Mountains of Washington and Oregon, and sold in grocery stores throughout the nation.

The Montana berries thrive in acid soil, especially mountainous areas with granitic rock. (This makes the Bitterroot Mountains an excellent place to start your hunt.) Old burns, old lumbering areas, old clearcuts, creek bottoms and old access roads support their share of berries. The shrubs seem to be one of the earlier (about five years) stages of natural regrowth.

But what of whortleberries, bilberries and grouseberries? All are common names for Montana huckleberries. Six species of the berries flourish in Montana. None of the varieties are poisonous, but one is literally "of the rocks." *Vaccinium scoparium* is a low-growing shrub with very green stems and red fruit. It thrives as underbrush in lodgepole forests, has very small berries and is best left for the birds.

The Montana huckleberry is an erect shrub and can grow as high as six feet. It has small, short-stalked leaves that are almost elliptic and that lack true end buds. The twigs are slender, often green or red, and the flowers are small and greenish white suffused with pink and magenta. The fruits, each containing 10 or more seeds, are small blue to black berries (red in one species), and edible.

Even though we know the berries aren't really huckleberries, let's call them huckleberries anyway since that's the common name that seems to have stuck. Chances are you won't care what they're called when you sink your teeth into that muffin or pie.

Huckleberries provided a major source of food for many Indian tribes, who ate them fresh, stewed or cooked with meat or dried for winter use. Their custom of drying is one campers should note. The first lightweight camping or traveling food was Indian pemmican. The original recipe was made from buffalo, elk or venison jerky, nuts and berries, but it's almost as easy to make today:

1 cup dried beef (jerky)
1 cup dried huckleberries
1 cup unroasted peanuts or pecans
2 tsp honey
4 tbsp peanut butter
3/4 tsp cayenne pepper

To make jerky, cut all the fat from beef or venison, then cut it in thin slices. Dry in oven with oven at lowest temperature and door open slightly until meat will break and crumble.

Pound the meat into powder or grind with an electric blender.

To dry berries, spread them thinly on a tray and put them in the sun each day and in a warm room each night for about a week. If the weather is uncertain, they can be kept indoors all day. Or spread them on clean paper in a warm attic for about ten days.

Add the dried berries and nuts. Here the recipe can get really elaborate with dried raisins, apricots and peaches added too, but remember to add proportionate amounts of the other ingredients for each new fruit.

Heat honey and peanut butter to soften it, then blend with the mixture. Add the pepper and make sure it's worked thoroughly through the mixture.

To go completely natural, pack the mixture in sausage casings available at meat counters or put the mixture in plastic bags or containers.

Keep in cool, dry place and it will keep indefinitely. Pemmican can't be beat as a snack on the trail.

The Montana huckleberry is an erect shrub, sometimes growing to six feet tall. It has short, elliptical leaves and small blue or black berries.

Dried huckleberries can be substituted for raisins in many recipes and a cupful of berries and a chopped onion make a tasteless stew tasty.

But huckleberries don't have to be processed to be eaten. I found a recipe called Fluff Pie that has me drooling:

3-1/2 doz vanilla wafers
1/3 cup melted butter or margarine
1/2 tsp unflavored gelatin
1/2 cup butter
1-1/2 cup powdered sugar
2 beaten eggs
1 pint cream
fresh huckleberries

Crush the wafers into fine crumbs using a rolling pin. Combine these with the melted butter and gelatin. Mix until all crumbs are evenly dampened, then press into a pie plate. Chill the crust until the bottom is firmly set.

Cream the rest of the butter until it is soft, then gradually add the sifted powdered sugar. Add 2 beaten eggs and then beat the whole mixture until it is fluffy. Pour into the crust and smooth top. Whip the cream until it is stiff, add sugar to taste, then fold in as many berries as it will hold. Pile this over the butter-egg mixture and sprinkle the top with wafer crumbs. Chill at least 4 or 5 hours or overnight.

If you like the old-fashioned two-crust pie, line a 9-inch pie plate with an uncooked pie crust, then combine:

4 cups wild huckleberries
1 cup sugar
3 tbsp flour
1/2 tsp salt
juice from 1/2 lemon
small amount of grated lemon rind
1/2 tsp ground nutmeg

Mix well and fill the pie shell. Dot the top with butter, then seal on the top crust, perforating it in several places with a fork.

Bake at 400° for 35-40 minutes.

And huckleberry cookery wouldn't be complete unless muffins were mentioned. The book I consulted listed two great secrets for making muffins with wild berries: (1) flour the berries and (2) don't overmix the batter.

Sift together in a round-bottomed bowl:
2 cups flour
2 tbsp sugar
1/2 tsp salt
2 tsp baking powder
1 scant tsp baking soda

Stirring from the outside of the bowl, add 1 cup drained but damp, fresh or canned huckleberries to the dry ingredients. Stir gently until they are all separated and coated with flour.

Then add:
1 slightly beaten egg
2 tbsp melted butter
3/4 cup buttermilk

Stir just enough to dampen all ingredients. The mixture will be thick, more like sticky dough than batter.

Use an ice cream dipper or tablespoon and fill greased muffin tins half full. Bake at 400° for about 18 minutes. Makes about 1-1/2 dozen muffins.

Fritters are another breakfast treat. All you need is:
3 tbsp sugar
1 cup commercial biscuit mix
1/3 cup milk
1 beaten egg
1 cup wild huckleberries

Mix ingredients together and drop by spoonfuls into hot fat. When they are nicely browned, drain on paper towels or paper bag and sprinkle with powdered sugar.

Remember wild huckleberries can be easily frozen and canned, as well as dried. To freeze, simply pack them in containers and set in the freezer. Canning is almost as simple. Pack the berries in jars, cover with a syrup of 4 parts water to 1 part sugar, seal and process in boiling water for 20 minutes. Check the seal and store.

Frozen berries can be used just as you would use fresh fruit, and the canned variety works well in pies and muffins. One recipe that makes good use of the canned berries is a cream cheese pie. For it you need:

1 quart jar of wild huckleberries and juice
1 pastry shell
3 oz cream cheese
3/4 cup sugar
3 tbsp cornstarch
2 tbsp lemon juice

While you are baking the pie crust, cut any left-over crust into fancy shapes and bake them too. These smaller pieces will bake quicker so keep an eye on them.

When the shell is cooled, work the cream cheese until it is soft, then spread it on the shell. Drain the berries and keep the juice. Pour berries over the cheese.

Mix sugar and cornstarch in a saucepan. Gradually add the berry juice. Cook, stirring constantly until it is thick and clear. Cool slightly, then stir in lemon juice.

Pour this glaze over the berries in the shell. Trim with the fancy shapes. Serve with whipped cream.

The list of recipes for wild huckleberries goes on and on. Use them in a steamed pudding to complement an elegant dinner or in muffins for a family breakfast in the wild. No matter what name they're given, Montana huckleberries are good eating.

THE WATER USE ACT

EDITOR'S NOTE—The Department of Natural Resources and Conservation (DNRC) is preparing to administer the recently enacted Montana Water Use Act. Already, some confusion and many questions have arisen. So, the agency has made this list of "most commonly asked" questions and then answered them. For more information contact: Water Resources Division, Department of Natural Resources and Conservation, Sam W. Mitchell Building; Helena, MT 59601. Phone: (406) 449-3634.

Q—Will the water I use be affected?

A—All Montana waters—surface, ground and geothermal— are now included in one administrative system.

Q—What should I be doing now?

A—The law becomes effective on July 1, 1973; on and after that date, three kinds of situations may require action on your part:

(1) If you intend to begin a new use of water (one not begun before July1) you must file an application for a permit with the DNRC. The only exception to the permit system of acquiring a new water right is that, outside the boundaries of an established controlled ground water area, a permit will *not* be required before a well is drilled to appropriate water for domestic, agricultural or livestock purposes if the maximum yield is less than 100 gallons per minute. However, the water well driller must file a well log report, and the appropriator must file a notice of completion with the DNRC within 60 days after completion of the well. If notice of completion is not filed, the appropriator's water right will not be recognized.

(2) If you buy land and thus acquire a water right, you, the purchaser, must file a copy of the transferring instrument with the DNRC, as well as the appropriate county.

(3) If you want to sever a water right from the land, or effect any change in your water right, including, but not limited to, place of diversion, place of use, purpose of use, or place of storage, you must first obtain DNRC's approval. (Appropriate forms are available from the DNRC and local county clerk and recorder's offices for all three of the above situations.) If you're not involved in any of these situations, all you need do is wait until your area is selected for court determination of existing water rights.

Q—What is an existing water right?

A—It's a right to the use of water which would be protected under the law as it existed prior to the effective date of the act (July 1, 1973). If, in the past, you've diverted water from a stream, pumped it from a well or irrigated with flood waters, you probably have an existing right to the amount of water you actually put to a beneficial use. However, the filing or nonfiling of a claim to water does not in itself give or deny a legal right to water. The key to an existing right is beneficial use, defined in the law to include agricultural (including stock water), domestic, fish and wildlife, industrial, irrigation, mining, municipal, power and recreational uses.

Q—What should I do to confirm an existing right?

A—At this time, nothing. Eventually, however, the DNRC will initiate a court proceeding in your area for determination of all existing rights. Although no timetable has yet been decided, areas with the most urgent water problems will be given highest priority.

When your area is selected, ample notice will be given by newspaper publication and mail, and you will have one year in which to file a declaration of your existing right with the DNRC (on a provided form). Required information includes the dates of appropriation and first application of the water, the amount and purpose of the water appropriated, the place and means of diversion, the place and time of use and a true copy or the docket number of any judicial decree, notice or other claim or evidence on which the existing right is based.

Information from submitted declarations, together with earlier court proceedings, records of rights under the ground water code, notices of appropriations, water resources surveys, etc. will be compiled by the DNRC and submitted to a District Court in the area for a determination of existing rights.

Q—Must I go through a complete court proceeding if my water rights have already been adjudicated?

A—You may not have to. Copies of the court's preliminary decree, based on data gathered by the DNRC will be mailed to all interested parties, and the preliminary decree will become final if no objections are filed. Certificates of water rights will then be issued by the DNRC, recorded by the county clerk and forwarded to the appropriators.

Q—What should I do if I buy water from a water association or irrigation project?

A—Nothing. You have a "contractual" right; it is the actual holders of the water rights who must file declarations of existing rights and apply for permits.

Q—Do I contact the DNRC if I become involved in a controversy over water rights?

A—In most cases, disputes will continue to be handled by the District Courts. The DNRC may initiate court proceedings for a determination of existing rights in the area if a determination has not already been made. It may also provide legal assistance to a Montana appropriator who becomes involved in a water controversy with a federal agency or another state.

Q—Can I reserve water to be put to use at some future time?

A—Not as an individual. After July 1, the federal government, a state agency or a political subdivision such as a town or an irrigation district may request a reservation of water from the Board of Natural Resources and Conservation. Again, appropriate forms will be available.

Q—Will I be required to install measuring devices?

A—The act provides that the Board of Natural Resources and Conservation may require appropriators to install suitable controlling and measuring devices and report their readings. These rules have not yet been adopted, but it is anticipated that such devices will be required only in areas where water use is critical. Measuring devices are already required on adjudicated streams where a water commissioner has been appointed.

edited by
Bill Schneider

THE CATCHALL

Montana National Park?

EDITOR'S NOTE—The following is one writer's solution for the many environmental problems plaguing Montana. The "Billings Gazette" ran it in its February 4 editorial section and called it a "futuristic fantasy" that has no chance of actually happening because human nature forbids it. We agree, of course. But after reading it several times, we are forced to wonder. What do you think?

MONTANA NATIONAL PARK, Feb. 4, 1984—Pete Snorkel laughed as he read the weathered old *Billings Gazette* copy he'd just found among other debris in his attic.

The funniest part, he thought, was where a former governor stated: "We can't just build a fence around Montana."

That fence, the salvation of Montana, and possibly for all humanity, had been exactly what the legislature had decided to build (after tremendous public pressure) about a decade earlier.

The fence, 18 feet high, anchored into the ground 14 feet deep, with barbed-wire guards pointing in and out, had cost Montana taxpayers billions of dollars. It might take another 10 years till it was all paid off, the way things were going.

The human guards who patrolled the fence cost plenty, too. At first it was thought they would cost too much, but it wasn't long before it was discovered that they brought in more than six times their own cost.

That was through fines levied against those who were caught trying to break into Montana.

(Two men, in separate episodes, were caught trying to get out, but both were judged insane. If they had really wanted to leave, tax-paid conveyances would have offered them choices to spare. It was getting into the state that was the problem.)

The fence served a dual purpose. Mainly it kept outsiders from entering unless they went through one of seven toll gates. And it kept Montana's wild game from escaping, though there was little evidence any of it wanted to.

The imported Kodiak bears tested one northern portion of the fence in a pretty rough manner once every year, of course.

The big question in the state now wasn't about the fence.

It was about the quota on visitors and the amounts they should be charged for each activity.

Some wanted to double all charges and halve the quotas, insisting that tourists sometimes blocked their view.

Others said Montana National Park owed it to the rest of the world to be open to as many as possible.

There was no question that doubling the charges and halving the quotas would have brought in just as much money. Applications to enter Montana were stacked higher than the fence—on microfilm.

The MNP Chamber of Tourism kept touting the glories of visiting Montana while most residents kept insulting all the tourists they could, hoping they wouldn't come back. But the tourists kept coming, with the Chamber taking the credit.

(The Cold Cannibal Association, which stressed that Montana temperatures are usually 74 below zero and that cannibals roam the countryside in droves, was the chief organized effort to repel tourists, but without much success.)

Despite all the advertisements

SPRINGBOARD

"Located in the world-famed Madison River Valley, The Shining Mountains Ranch offers an unparalleled opportunity for Montanans to invest in their own future. This is land that will remain unspoiled, the way it was in the days of Lewis and Clark, General Custer and Charlie Russell. A piece of the past that retains its natural beauty in the present and will continue to do so into the future."—*from an advertising supplement to Montana daily newspapers and selected weeklies (April 14, 1973), describing a large ranch south of Ennis that is being subdivided for homes sites*

FOR DISCUSSION

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THE CATCHALL

about the hunting, fishing, boating, hiking and other activities, everybody knew the main reason everybody wanted to visit Montana was so they could breathe without wearing that awful gas mask. It was the only state left where a person could rely on safely going maskless every day.

Visitors from Europe, especially, commented on the joys of actually breathing "straight air," as they called it.

And every visitor thrilled to the very thought of actually having the opportunity to hunt moose, elk, deer, antelope, bison, and the exotics, though only a few actually came up with the few thousand dollars necessary to actually hunt.

There was some talk of cutting the fees in order to keep game herds in check. Residents were limited by only one hunting law: Hunt all you want, but eat all you shoot.

Yes, things were a lot different than in that era when the battle cry of many well intentioned Montanans was: "God Wants Montana for Energy."

They had meant a type of polluting energy, the kind so many other states were now overflowing with.

Since the fence, the kind of energy Montana had been supplying was a much more needed variety, the spiritual, recreational kind.

Other states were only too happy to supply Montana with their pollution-produced energy and goods in return for the privilege of having their citizens visit Montana for only a few days each year.

Among the activities that kept those crowds of tourists waiting: the 318 ski areas; the elk and wild pony roundups and sales; daily rodeos, fishing derbies, canoe races, shooting matches, nature walks; the monthly taxidermy show and sale; and coal tours, during which coal was viewed in its natural habitat.

Exports of genuine Montana beef, pork, mutton, flour and sugar brought in a fortune annually, since it was the only certified uncontaminated food source left.

The chain of "Old McDonald's Farms" was a booming concern, with hundreds of thousands of applicants on file, all waiting to milk a cow by hand, plow a furrow with a horse-drawn plow, and enjoy similar simple joys.

There was still no fee for visitors' dangling their feet in genuine uncontaminated fishing water (once the daily visitor's fee was paid, of course), but even the minimal charge for using Montana landscapes as artistic subjects was bringing in a small fortune.

Yes, Montana National Park, the only easily accessible natural state left in the world, truly had reason to rejoice. And it was all thanks to that fence.

Is bentonite mining escaping the public's eye?

by Ken Walcheck

On a bone-chilling day last November, I firmly planted my feet at the edge of a 40-foot highwall in south Carter County and looked down into a gigantic pit filled with about 30 feet of murky, clay-colored water. Looking to the west, I saw bentonite spoil piles and pits as far as I could see. I found it almost impossible to believe that a bentonite mining operation could scar a fragile prairie landscape to the extent this one had.

An owner of land adjacent to the mining operation (who asked not to be identified because he was afraid of being placed on the mining companies' blacklists) gestured with a ranch-roughened hand toward the mining operation and commented, "The damage they (the mining companies) did was terrible. They would let down the blade of a bulldozer and just take off."

From our vantage point, an ugly rash of bulldozer tracks spread out across the prairie hills. In undulating patterns the tracks led from one pit to another—a sight that, as one area resident put it, "makes you sick every time you look at it."

Mining for bentonite in Carter County started in 1948. To date, more than 3.2 million cubic yards of overburden have been removed. That's enough to fill 640,000 gravel trucks. Commercial deposits of bentonite are also being mined or developed in Phillips, Rosebud, Treasure and Valley Counties.

Bentonite (a commercial name) is a clay, consisting primarily of the mineral, montomorillonite. The geologist would classify it as a form of altered volcanic ash.

It is used in soaps and washing compounds and is added to clays to increase plasticity.

Chemical uses of bentonite include preparation of catalysts for gasoline refining, decolorization of oils and other fluids, as a thickening or suspension agent, and in water purification processes.

Bentonite miners point out they are actually mining a fraction of the land. But this claim ignores the vast surface acreage they have peeled off and

YOU WON'T BELIEVE THIS!

At times something happens that is best left unpublished because nobody will believe it.

Well, that may be the case here, but we're printing it anyway.

On Wednesday, February 21, 1973, district one (Kalispell) employes were flying over the South Fork of the Flathead region of northwest Montana when what they call an "unusual mirage" was spotted. It was captured on film, as the accompanying photos point out.

The scene is rugged Glacier National Park in both photos. Both were taken from approximately the same position, but at different times. The left photo shows the normal rugged, serrated horizon characteristic of Glacier. But on the right, these peaks all seem to be "flattened out" into a sort of plateau.

It isn't possible, we know. But if there's anyone out there who can explain the optics of this, we would like to hear from you.

crisscrossed with roads to find that tiny fraction. From a broad view, the damage can be placed on a scale all of its own in relation to environmental degradation.

Past reclamation attempts are, for the most part, superficial and inadequate. Reclamation has centered on partially grading the spoil piles, preparing a seedbed and reseeding around the periphery of the pit. Some pits have not even been backfilled with the extracted overburden. It is also difficult to find places where topsoil has been distributed over the leveled spoil piles.

Most excavated pits have noticeable highwalls and are filled with water. The miners are also reluctant to admit that many of the "reclaimed" spoil piles have been placed on undisturbed land, thereby taking even more land out of productive use.

I inspected some of the spoil piles created in 1948 and noted they were devoid of vegetation because of the toxic make-up of the overburden. That's not too encouraging, considering nature has already had 25 years to revegetate the mined land. It's easy to forget that it took about 10,000 years for the soil to develop in eastern Montana. According to Robert Curry, associate professor of environmental geology at the University of Montana, only brief geologic periods favorable for soil formation have occurred in the arid west Today, many soils aren't forming and they cannot under present climatic conditions, Curry says.

Wildlife, too, has taken a beating on the scarred and pitted landscape. The once verdant rolling hills that previously supported excellent wildlife populations have become a desolate wasteland with a tremendous loss of deer, antelope and upland game bird habitat. Many of the pits hold as much as 30 feet of water but can't support fish life. Why? Because the colloidal bentonite particulates remain in permanent suspension and are toxic to aquatic vegetation and fish.

What does the future hold for bentonite mining in eastern Montana? The 1973 Open Cut Mining Act which regulates the mining of bentonite, sand and gravel lays down a set of specific requirements that will, hopefully, prevent any future exploitative, damn-the-environment eras.

Indeed, it's high time we stopped treating certain mining operations as if they were a band of old-time prospectors heading through the hills of southeastern Montana with their packstrings to win the West for us. That's already been done. Now we must save it.

SORRY ABOUT THAT

In the May/June 1973 issue, we reproduced three paintings by Carl Bodmer to illustrate an article on the wild Missouri. The credit line, "courtesy of the Montana Historical Society," was inadvertently omitted.

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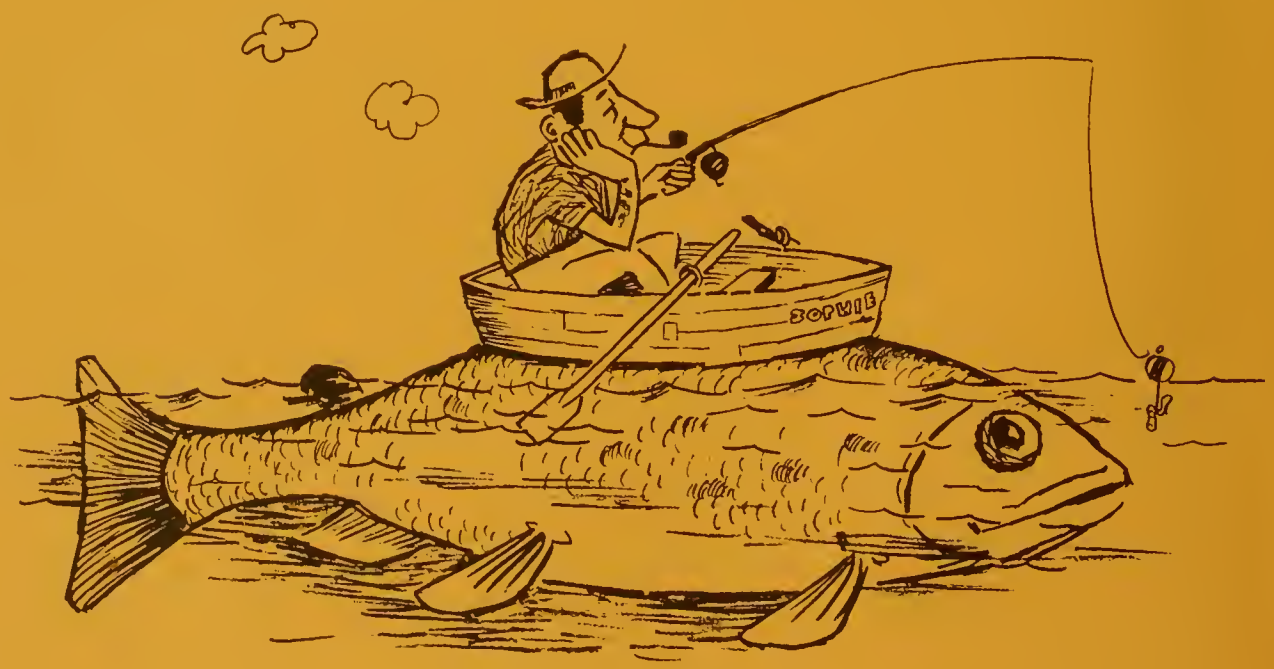
—still a course in incompleteness—

Montana State Fishing Records



illustrated by Vern Craig

Lately, we've received a great many inquiries on state fishing records. Some wondered if they are even recorded at all.

They are, but as pointed out in the list below, records are still incomplete.

In the past we've delayed publishing them in MO because some species didn't even have a recorded trophy. Others were backed by unverified information.

But, now, we're going ahead and publishing the most complete list of accurate state fishing records we have. Notice that some of our best game species have *no record at all.* So, the first trophy that comes in *is it.* We don't want to make a six-inch grayling the state record, so we will use some discretion in making sure the new state records in these "open" categories are at least larger than usual.

There are a few ground rules, however, that must be followed to make your "big one" a state record. They are:

- The fish must be weighed on a government-tested scale such as those found at grocery stores or meat markets.
- If possible, the fish must be weighed in the presence of a Department of Fish and Game employe. An affidavit (stating length and weight) from the store at which the fish was weighed will be accepted.
- The fish must be correctly identified, so in confusing situations, a department fisheries biologist should be called in to make sure the trophy is correctly identified. A picture clearly showing all identifying characteristics will suffice.
- Information — length, weight, how caught, date caught, name of water, nearest town and name and age of fisherman—should be sent to the Environment and Information Division, Department of Fish and Game; Helena, MT 59601.

Periodically, we will republish updated lists in MO.

Species	Weight (lbs.-oz.)	Angler	Year	Location
Rainbow trout	20 lbs.	C. J. Brohaugh	1952	Cliff Lake
Cutthroat trout	16 lbs.	Wm. D. Sands	1955	Red Eagle Lake
Brook trout	9 lbs. 1 oz.	John R. Cook	1940	Lower Two Medicine Lake
Brown trout	29 lbs.	E. H. "Peck" Bacon	1966	Wade Lake
Dolly Varden	Open—no record			
Lake trout	Open—no record			
Kokanee	5 lbs. 4 oz.	Unknown	1969	Helena Valley Reservoir
Coho	3 lbs. 12 oz.	Unknown	1971	Fort Peck Reservoir
Grayling	Open—no record			
Mountain whitefish	4 lbs. 2½ oz.	Bob Johnson	1973	Clark Fork River
Lake whitefish	Open—no record			
Largemouth bass	7 lbs. 6 oz.	Jere Hightower	1973	Ninepipe Reservoir
Smallmouth bass	Open—no record			
Bluegill	2 lbs. 8 oz.	Geo. Schlosser	1967	Dengel Reservoir
Yellow perch	1 lb. 14 oz.	Merle McKinney	1972	Nelson Reservoir
Black crappie	Open—no record			
White crappie	Open—no record			
Walleye	13 lbs.	Robert Mills	1972	Nelson Reservoir
Sauger	4 lbs. 10 oz.	Ted Peterson	1972	Fort Peck Reservoir
Northern pike	37 lbs. 8 oz.	Lance Moyer	1972	Tongue River Reservoir
Channel catfish	21 lbs. 5 oz.	Gary Eppers	1964	Missouri River
Black bullhead	Open—no record			
Burbot	11 lbs. 12 oz.	Jim Cooper	1967	Fort Peck Reservoir
White sturgeon	96 lbs.	Herb Stout	1968	Kootenai River
Pallid sturgeon	Open—no record			
Paddlefish	142 lbs., 8 ozs.	Larry Branstetter	1973	Missouri River
Goldeye	Open—no record			
Drum	4 lbs. 12 oz.	Bob Ferguson	1972	Fort Peck Reservoir

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1973 LEGISLATIVE ROUNDUP

The 43rd Legislature, which adjourned March 24, 1973, considered a wide range of environmental legislation pertinent to fish and wildlife. The following is a brief summary of that legislation.

Because of space limitations, only summaries of bills signed by Gov. Thomas L. Judge, deferred to 1974 or left in committee are included. Additional information is available from Legislative Council, State Capitol, Helena, MT 59601.—Ed.

SENATE BILLS

S.B. 94 (Bertsche, D-Great Falls; Cochrane, R-Billings, and others)—signed by governor

"Montana Strip Mining and Reclamation Act." Provides for control of prospecting for and strip mining of coal, clay, phosphate rock and uranium. Establishes a system for permits, reclamation plan requirements, methods of operation and penalties. Specifically, all strip mining operations must have annual permits. Selective denial of permits allowed where circumstances warrant. Before a permit will be issued, a plan for surface reclamation and restoration must be submitted to the State Board of Land Commissioners. Restoration must be current. Authority to halt any operation violating the law rests with the Board. Violators subject to $1,000 per day fine, forfeiture of bond and revocation of permit. Contour strip mining banned. Citizens may bring suit. The owner of surface rights may recover from an operator for damages from contaminated water draining from the operation. (See the May/June MONTANA OUTDOORS for a complete summary.)

S.B. 147 (Carl, R-Missoula; Keenan, D-Anaconda, and others)—signed by governor

Defines "resident" for purposes of hunting and fishing licenses.

S.B. 150 (Carl, R-Missoula; Siderius, D-Kalispell, and others)—signed by governor

Nonresidents and residents under 18 years old will be required to show a certificate of competency or some other certificate verifying they have successfully completed a course in safe handling of firearms in their state before they will be issued a Montana hunting license. This ruling previously applied only to resident youths.

S.B. 178 (Carl, R-Missoula; James, D-Joplin)—signed by governor

Tightens up boating and water safety regulations: operation, occupancy and licensing.

S.B. 181 (Klindt, R-Billings)—deferred to 1974

To establish a Division of Recreation, Parks and Physical Education within the Department of Natural Resources and Conservation. If enacted, the Parks and Recreation Division would no longer be under administration of the Department of Fish and Game.

S.B. 188 (Darrow, R-Billings; McKeon, D-Anaconda, and others)—deferred to 1974

"Pollution Disclosure Act of 1973." To provide for reporting by individuals, companies, etc. to the Board of Health, the kinds and amounts of contaminant being discharged into air, water or environment.

S.B. 224 (Keenan, D-Anaconda; Carl, R-Missoula)—signed by governor

Director of Fish and Game sets qualifications for persons taking fish or game for scientific purposes.

S.B. 246 (Siderius, D-Kalispell)—deferred to 1974

Original intent was to raise the fee for overnight camping on state lands devoted to recreational or campground purposes to $3. Of this fee, three-fourths would go toward furnishing campgrounds and one-fourth for recreational access acquisition. However, the bill was extensively amended and, in general terms, would provide that fees charged by state agencies for the use of state land be devoted to recreational and campground use.

S.B. 254 (Carl, R-Missoula)—signed by governor

Gives the $1 fee for annual snowmobile decals to the Fish and Game Commission.

S.B. 318 (Carl, R-Missoula; Moritz, R-Lewistown, and others)—deferred to 1974

"Montana Snowmobile Act of 1973." To require a $17.50 county registration of snowmobiles and an annual decal. Revenue to be earmarked for Fish and Game enforcement of snowmobile laws and acquisition, maintenance, planning and development of snowmobile facilities. To set equipment, noise level and operational standards.

S.B. 387 (Rosell, R-Billings; Turnage, R-Polson)—deferred to 1974

To limit to public lands the requirement of reclamation of lands disturbed by the taking of natural resources. Would mean that reclamation would not be required on damaged private land.

S.B. 401 (McGowan, D-Highwood; Bollinger, D-Glasgow)—deferred to 1974

To establish a program for control of soil erosion and sediment damage resulting from land disturbing activities within Montana.

S.B. 404 (Bertsche, D-Great Falls; McGowan, D-Highwood, and others)—signed by governor

"Strip Mined Coal Conservation Act." To prohibit waste of coal that is economically feasible to mine and fit for sale.

S.B. 405 (Broeder, R-Kalispell; Bertsche, D-Great Falls)—deferred to 1974

To give the Board of Natural Resources and Conservation authority to establish forestry standards on state and private forest lands, related to reforestation, road construction and road maintenance, harvesting trees, applying chemicals and fertilizer and slash disposal. To provide a Forest Practices Advisory Council.

S.B. 418 (Harrison, R-Helena)—deferred to 1974

To suspend the status of the Sun River Game Preserve

until July 1, 1976. To allow the Department of Fish and Game a trial period for game management.

S.B. 424 (Aber, R-Columbus)—signed by governor

To prohibit the filing of false mining claims. Filing must be preceded by proper location of the claim physically upon the ground, by establishment of proper notice of the claim and by designation of the surface boundaries of it with posts or monuments, as required by law.

S.B. 443 (McGowan, D-Highwood; Bertsche, D-Great Falls) —signed by governor

"Open Cut Sand and Gravel Mining Act." Provides for reclamation and conservation of lands open cut for removal of sand or gravel. Requires reclamation contracts in operations resulting in removal of 10,000 or more cubic yards of overburden or product.

S.B. 444 (McGowan, D-Highwood; Harrison, R-Helena, and others)—signed by governor

"Montana Water Use Act." Implements a section of the constitution requiring that legislature provide for administration, control and regulation of water rights and establish a system of centralized records of all water rights. Further provides that all uses of water are public uses and that water is property of the state for the use of the people. Water is subject to appropriation for beneficial uses (use of water for the benefit of the appropriator, other persons or the public, including but not limited to agricultural [including stock water], domestic, fish and wildlife, industrial, irrigation, mining, municipal, power and recreational uses). "Appropriate" now also means reservation of water by a public agency in certain cases, e.g. to maintain stream flow for fish and wildlife or for recreational use. Stream flow may be preserved for the benefit of fish and wildlife. The state, any political subdivision of it, the United States or any agency may apply to the Board of Natural Resources and Conservation to reserve waters for existing or future beneficial uses, or to maintain a minimum flow level or quality of water throughout the year, or at such periods or for such a length of time as the Board designates. "First in time, first in right" principle will be maintained regarding action to be taken as the adjudication of water proceeds. (See page 8 of this issue for further details.)

S.B. 445 (Darrow, R-Billings; Bertsche, D-Great Falls, and others)—signed by governor

Amends sections of a floodplain law and provides for a change in the definition of a 50-year flood frequency to 100-year frequency. Providing for the Department of Natural Resources and Conservation to enter into agreements with private consultants to acquire flood data.

S.B. 465 (Moore, R-Two Dot)—deferred to 1974

To require the Department of Fish and Game to pay court costs and attorney's fees when persons are arrested who are unable to pay their own counsel.

HOUSE BILLS

H.B. 46 (Brand, D-Deer Lodge)—signed by governor

An anti-litter act. Provides minimum fine of $25, imprisonment, or both. Court can order offender to pick up litter from any public street or highway, public or private right-of-way or public beach or park where he may have dropped it. Holder of a Montana resident or nonresident fishing or hunting license or camping permit convicted of littering while engaging in these activities forfeits his license and the privilege to hunt, fish or camp for 90 days.

H.B. 78 (Fagg, R-Billings; Huennekens, D-Billings, and others)—signed by governor

Beginning April 30, 1974, resident fishing license increase from $4 to $5; nonresident season fishing from $15 to $20; six-day nonresident tourist fishing from $5 to $10, and one-day license from $1 to $2.

H.B. 82 (Hager, R-Billings; Murphy, D-Stanford; Tierney, R-Great Falls; Bennetts, D-Helena)—signed by governor

Lowers the age requirement for 15¢ pioneer hunting and fishing license from 65 to 62. Effective July 1, 1973.

H.B. 88 (Towe, D-Billings; Swanberg, D-Great Falls, and others)—left in Natural Resources Committee

"Montana Environmental Protection Act." To provide that an individual can bring action in district court against any person causing—or about to cause—environmental damage. Action could precede, rather than follow, the actual environmental damage. To provide that the state's natural resources, including but not limited to air, water, land, and timber, should be protected from pollution, impairment or destruction.

H.B. 97 (Fasbender, D-Ft. Shaw; Bardanouve, D-Harlem, and others)—signed by governor

"Montana Resource Indemnity Trust Act." Provides for an annual tax of $25 on all industries extracting nonrenewable natural resources, plus one-half of one per cent of the gross value of the product over $5,000. Funds and investments from the account to be used to improve the total environment and rectify damages to it.

H.B. 126 (Kvaalen, R-Lambert; Fagg, R-Billings, and others) —signed by governor

Forbids hunters to drive vehicles off established roads or trails, except to retrieve a slain animal not easily reached by other means.

H.B. 127 (Bardanouve, D-Harlem; Gerke, D-Billings, and others)—signed by governor

"Montana Utility Siting Act of 1973." Gives the Department of Natural Resources and Conservation authority to require and review long-range plans of utilities. The Department must approve energy generation and conversion plant sites and associated facilities. The act requires certification of such facilities before construction can begin. Opinions on the advisability of granting the certificate will be sought from Departments of Health and Environmental Sciences, Highways, Intergovernmental Relations, Fish and Game and Public Service Regulation. *Need* for the facility will be a prime consideration in the decision. However, no certification is required for facilities under construction or operating as of January 1, 1973.

H.B. 133 (Fagg, R-Billings; Warfield, R-Livingston, and others) —deferred to 1974

To establish a statewide system for designation and management of wild, scenic and recreational waterways by the Department of Fish and Game. The three types of waterways are defined, provision is made for public hearings on additions to the system and guidelines given for waterways management. Specific parts of the Missouri River are designated wild, scenic or recreational by this act.

H.B. 150 (Staigmiller, D-Cascade; Lien, D-Poplar, and others)—signed by governor

Provides a $5 resident and $25 nonresident fee for hunting mountain lions. Nonresidents not required to have the $15 bird, big game and fishing license, but must have the $1 conservation license.

H.B. 151 (Staigmiller, D-Cascade; Lien, D-Poplar, and others)—signed by governor

Establishes the mountain lion as a trophy animal and

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LEGISLATIVE ROUNDUP continued

deletes the requirement that its meat be used by the hunter. Hunting requires a trophy license and certain parts of the animal must be available to Fish and Game personnel for scientific purposes.

H.B. 205 (Johnston, D-Cut Bank; Stephens, D-Dutton, and others)—signed by governor

"Nongame and Endangered Species Conservation Act." Provides for management by Fish and Game Commission of nongame and endangered animals. Nongame wildlife does not include animals designated by statute or regulation as predatory. (Predatory animals [Revised Codes of Montana, 1947] include coyote, wolf, wolverine, weasel, skunk, civet cat and bobcat.) It includes any wild mammal, bird, amphibian, reptile, fish, mollusk or crustacean not already legally classified. Commission would propose a list of endangered species. No specific funding cited in bill.

H.B. 206 (Johnston, D-Cut Bank; Stephens, D-Dutton, and others)—signed by governor

Eliminates bison or buffalo from the official list of Montana big game animals. Provides protection for *wild* buffalo and makes it unlawful to hunt, shoot, kill, capture or possess wild buffalo, except as permitted by rules adopted by the Fish and Game Commission.

H.B. 217 (Lund, R-Scobey; Kosena, D-Anaconda)—signed by governor

Grants additional power to Department of Health and Environmental Sciences to comply with 1972 water pollution control laws. The department may inspect and monitor the discharge of sewage, industrial and other wastes.

H.B. 233 (Bardanouve, D-Harlem; Driscoll, D-Hamilton)—deferred to 1974

To transfer registration of snowmobiles from the Board of Equalization to the Registrar of Motor Vehicles.

H.B. 238 (Colberg, D-Billings; Huennekens, D-Billings; Towe, D-Billings; R. Harper, D-Butte)—signed by governor

Extraction of coal by strip or coal mining is not a public use. Eminent domain may not be exercised by the state where the title to the surface rights are owned by someone else.

H.B. 239 (Colberg, D-Billings; R. Harper, D-Butte; Holmes, D-Billings; Huennekens, D-Billings)—signed by governor

Requires permission of the owner of surface rights before mining or prospecting operations may be started.

H.B. 286 (Huennekens, D-Billings; Fagg, R-Billings; Colberg, D-Billings; Towe, D-Billings)—signed by governor

Procedures and drawing sites for special elk permits determined by the Fish and Game Commission. Previously, all drawings for special elk permits were held in the city or town nearest the hunting district, but no farther away than the county seat.

H.B. 356 (Colberg, D-Billings; Walborn, R-Hardin)—deferred to 1974

To establish a November, 1973 referendum to remove the provision that mining, extraction of ores, metals or minerals owned by one person, located beneath or upon the surface of property owned by someone else is a public use, in behalf of which the right of eminent domain may be exercised. (Since action on the bill was deferred to the 1974 session, the bill may be amended to read a November, 1974 referendum.)

H.B. 371 (Kimble, D-Missoula; Bennetts, D-Helena, and others)—deferred to 1974

To set up a system of footpaths and bicycle trails with funds from the State Highway Commission revenue fund.

H.B. 417 (Lucas, R-Miles City; Johnston, D-Cut Bank, and others)—signed by governor

Department of Fish and Game to establish mandatory checking stations for hunters and fishermen.

H.B. 465 (Baucus, D-Missoula; Norman, D-Missoula; Bennetts, D-Helena; Driscoll, D-Hamilton)—signed by governor

Broadens the statement of public policy to include air pollution prevention, solid waste disposal and referring to quality of water for all uses.

H.B. 474 (Swanberg, D-Great Falls; Lien, D-Poplar, and others)—deferred to 1974

To protect streams from anything that can obstruct, damage, diminish, destroy, change, modify or vary the natural, existing shape, form or *course.* Notice of planned construction must be given to Fish and Game Commission. Any party convicted of unlawful stream channel alteration required to restore the channel to as near its original condition as possible, or whatever other efforts are recommended by the commission for mitigation of damages. Private persons or organizations are brought under provisions of this law, as well as public agencies. To increase the arbitration boards to five (from three) persons, each representing different occupations and appointed by respective district judges.

H.B. 509 (Fasbender, D-Ft. Shaw; Walborn, R-Hardin, and others)—signed by governor

Changing the basis for determining and raising the strip mines license tax. The tax is computed as follows: (1) for each ton of coal having a British Thermal Unit (BTU) rating per pound of 7,000 or less, 12¢ per ton; (2) for each ton of coal with a BTU rating from 7,001 to 8,000, 22¢ per ton; (3) for each ton of coal with a BTU rating of 8,001 to 9,000, 34¢ per ton, and (4) for each ton of coal with a BTU rating of 9,001 and over, 40¢ per ton. The general fund of the county from which the coal was mined receives 1¢ per ton of the license tax. Each year, 5,000 tons of coal can be exempted from the tax.

H.B. 550 (Bardanouve, D-Harlem; Fagg, R-Billings)—deferred to 1974

To empower counties to adopt shoreline zoning regulations on lands abutting or lying close to navigable waters. If the counties don't do so by January 1, 1974, the Department of Natural Resources and Conservation would do the zoning.

H.B. 554 (Haines, R-Missoula; Kolstad, R-Chester; Murphy, D-Stanford)—deferred to 1974

To establish a statewide program for litter control. Department of Natural Resources and Conservation to be enforcing agency. Fines would be assessed.

H.B. 627 (Kvaalen, R-Lambert; Schepens, D-Sidney, and others)—left in Finance and Claims Committee

To appropriate money to the Department of Fish and Game for participation in a waterspreading (an irrigation system) and recreation project in Fallon County, including a small reservoir to catch runoff.

H.B. 628 (Bradley, D-Bozeman; Fasbender, D-Ft. Shaw, and others)—left in Natural Resources Committee

To acknowledge the existence of natural and potentially natural areas in the state and to provide for protection of these areas. To be known as the "Montana Natural Areas Act of 1974."

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MONTANA COAL--part four

by Ken Walcheck

the second battle of the rosebud

and a few more upcoming historic events

ALTHOUGH LESS FAMOUS than Custer's Last Stand, the Battle of the Rosebud (June 17, 1876) was larger and more mobile. And, it remains as one of Montana's most prized historic sites.

Now, logistic preparations for the "second" Battle of the Rosebud are noticeable, threatening to produce a resounding reverberation that could generate more controversy than did Custer's "Last."

The "new" Rosebud controversy centers around a value judgment weighing certain cultural, historical and archaeological values against the dollars and cents value of strippable coal deposits. Or, more specifically, does the relative importance of a battlefield as a historic site outweigh the worth of a substantial portion of the total 12 billion tons of strippable sub-bituminous coal under approximately 900,000 acres in the Decker-Birney area of southeastern Montana?

The question seems to have already drawn two answers. Gulf Mineral Resources evidently thinks the coal is most important as they have, according to Big Horn County courthouse records, leased several plots on and adjacent to the battleground. (Other coal companies hold leases near the site.)

But the National Park Service obviously thought the reverse. In 1972 the agency designated the battlefield as a National Historic Site.

(Being on the National Register of Historic Sites doesn't actually prevent degradation by strip mining or any other land use. It does, however, require a lengthy process of review before development can proceed. So, it acts as another stumbling block for those who wish to extract material wealth from land of great historical value.)

The Decker-Birney area lies within the

"No man is fit to be entrusted with the control of the present who is ignorant of the past, and no people who are indifferent to their past need hope to make their future great." —Anonymous

Montana Coal continued

Colstrip, Mont.-Gillette, Wyo. "oval" which contains the country's largest reserve of strippable, low sulfur coal. Seventy per cent of the coal rights in this area belong to the federal government and are administered by the Bureau of Land Management (BLM) which has responsibility for leasing the coal. Because of impending commercial development of extensive coal deposits in southeastern Montana, the BLM compiled a multi-resource analysis of the Decker-Birney area in 1972.

Presently, the BLM plans no leasing of land on the Rosebud battlefield or other historical and archaeological areas. Edwin Zaidlicz, state director for the BLM, said, "Personally, I can see no justification . . . for mining such areas in the foreseeable future. We appear to have enough options available to preclude disturbing areas of national significance."

From a coal company's point of view, however, the Decker-Birney area contains all the components of a successful mining operation: shallow overburden, available water for industrial uses and thick seams of low sulfur coal, a substantial portion of which is on federal land and therefore open to competitive leasing.

But from an archaeologist's or historian's viewpoint, the area contains all the components necessary to justify protection and detailed study. Archaeologist Larry Loendorf, assistant professor of anthropology-sociology at the University of North Dakota, says it is a "unique" area and one of the "richest" in the country.

Unfortunately, strip mining destroys forever any possible historic value. Conversely, preservation for future exhaustive archaeological or historic study prevents coal stripping.

So, the battle lines are drawn for the "second" Battle of the Rosebud.

THE EARLIEST MONTANANS

Pioneers came to Montana long before the arrival recorded in most history books. The earliest Montana residents were, in fact, bands of nomadic stone age hunters who appeared approximately 13,000 years ago. They wandered aimlessly across vast sections of this alien continent for perhaps 20,000 years before that, after leaving Asia via the Bering Strait Land Bridge. These hardy, adventurous huntsmen probably saw the towering walls of receding continental glaciers crumble. Giant mammals such as the mammoth and the mastodon drifted ahead of them into this land where glacial lakes of melt water provided, in later years, a humid, almost semi-tropical environment.

As the years slowly passed, sprawling glacial remnants and countless lakes and potholes turned to damp shadows and the prairie became a sea of grass. Plant life flourished, and the vast game herds thrived. Man, by this time an experienced plainsman, increased in number and depended on the abundant life around him and remained content longer than ever before.

About 4,500-5,000 B.C., disaster came to the plains—a drought that lasted more than 1,000 long years. Both man and wildlife moved into the comparative comfort of adjacent mountains, coveting the water and shelter they found there. During this middle prehistoric period, people were still widely scattered, hunting large and small game and learning to supplement their sometimes meager fare with roots, plants and berries.

The eternal, punishing drought finally came to an end. The prairies slowly regained their fertile composure as the shrunken rivers filled and the gray valleys became breeding grounds for returning bison herds. Once again the eastern plains supported early man, now to a greater extent than ever before.

Since later traces of occupation are not buried as deeply as those laid down earlier, much evidence of hunters of the last prehistoric era (starting about 500 A.D.) exists. During this era, the hunter depended more on the bow and arrow and less on spears and spear throwers. Man domesticated the dog and constructed portable structures. Large-scale communal drives, requiring complex organization, were used to kill the many bison necessary for food, shelter, ornamentation, sinew (for bow and arrow making) and for ritual elements. Increasing leisure time allowed attention to religion and the arts, reflected in sacred stone structures, effigy monuments and in stylized symbols, both painted and etched onto rock surfaces.

Perhaps the most significant change of this period was introduction of the horse in the 16th century. The pedestrian aboriginal way of life

ABOUT THE AUTHOR

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the numbers game

It is especially difficult to assess the fuel supply picture because most of the data comes from industry and can be used for self-serving purposes. "It's all suspect," says one observer. "They can tell us there's a fuel crisis any time they want to." For one thing, the interpretation of raw geophysical information is a very sophisticated and complex task. Industry has built up unparalleled expertise in the field. It takes no imagination to deduce that the oil industry, for example, might find it beneficial to report dwindling reserves in order to generate pressure for more offshore leasing and continuation of tax subsidies designed to encourage more exploration. Similarly, there are some who believe the gas industry may be deliberately understating natural gas reserves in order to induce the Federal Power Commission to raise wellhead prices. Industry contends that the FPC held natural gas prices so low, and for so long, that development of new reserves was inhibited.

One wonders why reported discoveries of natural gas reserves plummeted rather suddenly after 1967—about the time gas producers were confronted with adverse decisions on rates. (In 1968, for example, net additions to reserves totaled 12.1 trillion cubic feet compared to the prior year's 21.3 trillion.) Lee C. White, former FPC chairman, asked the Joint Economic Committee on June 7, 1972: "How do you explain the fact that exploration for oil and discoveries of new oil reserves also declined during the period without any federal or state control over the price of oil?"

Many observers, including FPC officials, are skeptical of industry figures. Bruce C. Netschert, of National Economic Research Associates, Inc., has suggested rather subtly that industry personnel estimating reserves have a "keen awareness of the political impact of the results of their work." Netschert also has noted some mysterious revisions in industry estimates. (Testimony before Senate Interior Subcommittee on Minerals, Materials and Fuels; November 13, 1969.) FPC estimates of reserves are confined—in large measure because industry has declined to furnish relevant data sought. But those estimates made by the FPC tend to be significantly higher than the producers' figures.—Reprinted from the June 1972 CONSERVATION FOUNDATION LETTER

gradually gave way to heightened mobility and warfare among native peoples. Tribes who had hunted bison on the plains for as long as they could recall were forced to compete with other tribes moving into the area from all directions. Therefore, the horse to some degree changed nearly every aspect of the Indian's culture.

EARLY INDIAN VILLAGES

An Indian village on the windswept plains of eastern Montana during this last era must have been a lively and fascinating place. Dogs barking, children playing, women making clothing and men returning from a hunting expedition laden with bison meat—all create a picture of confusion, sound and motion. The same village in 1973 is a silent cluster of stone circles called "tepee rings" on the brown prairie; the only sound, that of the wind; the only motion, that of a tumbleweed rolling across the site and of a golden eagle circling high in the sky. The people are gone, and the only things attesting to their presence are buried fragments of objects which they made and used.

If a modern day visitor went into this village after all the people had gone, but before any deterioration had begun, understanding what had happened there would be difficult enough. The material culture of a people is only a small part of their total cultural pattern. Their behavior cannot be directly observed in their absence. Add the problem of disintegration over a period of several centuries and the magnitude of the archaeologist's task becomes painfully clear. He must attempt to say as much as he can about an entire way of life with only fragmentary remains of a few material products to guide him. It is this incompleteness of the hidden past which demands the archaeologist's interpretation of the wide range of prehistoric and historical activity scattered throughout the coal fields of southeastern Montana.

CULTURE OR COAL STRIPPING?

Projectile points, buffalo jumps and petroglyphs (rock etchings) describing the shield bearer, antlered creatures, grizzly bears and other historic treasures—these all exist in the Colstrip-Gillette "oval," which is now the focus of a nationwide debate over strip mining.

In the entire area of southeastern Montana coal lands, only two archaeological sites were excavated by archaeologists before 1970, the Powers-Yonkee site and the Kobold buffalo jump site. These sites disclosed that bison formed the economic foundation for prehistoric Indians in this area.

During summer, 1970, an archaeological survey was conducted in the Otter Creek drainage by students from Eastern Montana College, Billings. Although the study was limited, it showed the necessity of an organized archaeological survey with sufficient manpower and facilities to determine the nature, importance and density of sites in the area destined for strip mining.

A significant phase of BLM's Decker-Birney study was to assess the archaeological value of the area. About 100 archaeological sites were identified, varying from simple lithic material (sites at which surface litter indicates the manufacture of chipped stone articles had taken place)

to more outstanding sites such as petroglyphs. The survey, conducted in the southeast corner of the Colstrip-Gillette "oval" (Decker-Birney Planning Unit), indicated that hundreds of sites probably exist throughout the rest of the area.

Historically, the coal fields of southeastern Montana contain a kaleidoscope of reminders of the rawboned past—fur trappers, cowboys and homesteaders, gunmen and painted ladies, and Indian wars—plus a wealth of information which will be lost forever because nobody took the time to document it.

For 400 years, since the first meeting with white men in the 16th century, the Indians of the North American plains have stirred the imagination and interest of all who have come in contact with them. Part of that interest has been reflected in a great many scientific and historical accounts about Indian-military battles in the Decker-Birney area of southeastern Montana.

Historically, it would be hard to find a site more interesting than the Rosebud Battlefield—one which hasn't been marred by picnickers, high voltage transmission lines and strip mining operations

While pushing north with some 1,300 men, Gen. Crook ran into a superior force of between 2,000 and 5,000 Sioux and Cheyenne. The army shot more than 25,000 rounds of ammunition and authorities on the battle estimate the hostiles shot three to four times as much. The Montana Historical Society estimates Crook's losses at 10 killed and 21 wounded.

Crook weathered the onslaught of perhaps the most fearsome aggregate of spirited fighters ever to assemble on a battlefield. Historians say Crook thought he had met the entire Sioux nation and began withdrawing and fighting on the defensive as he slowly retreated to his base camp near Sheridan, Wyo. Eight days later when Custer met the same forces, Crook's troops were unable to assist.

Some historians speculate that had Crook given his opponents a convincing lesson in military tactics, Custer and his command may have lived to fight another day.

One specialist on this subject, Edgar I. Stewart, retired professor, Division of History and Social Science, Eastern Washington State College, comments: "Although reported to the American public as a victory for Crook, this battle was far from being that. Crook received a sound thrashing. . . . The Indians were confident and unafraid and Crook's refusal to seek contact meant that the campaign from the south had collapsed completely and that the Indians were now free to devote their undivided attention to Generals Gibbon, Terry and Custer." The

Historical Site Recommendations

1. No action should be taken to jeopardize the integrity of the Rosebud and Battle Butte (Battle of Wolf Mountain) battlefields, Stag Rock and Needle Rock.
2. Battle Butte should be submitted to the National Park Service for consideration as a National Historic Site.
3. Further study should be conducted on Stag Rock and Needle Rock to see if they warrant submission to NPS for determining National Historic Site qualifications.
4. Lands adjacent to the Rosebud and Battle Butte sites should be protected until it is determined how much land might be needed in conjunction with the sites.
5. Additional study should be made to determine significance of the Hanging Woman Creek site. Until the significance is determined, the land should remain undisturbed.
6. An inventory and evaluation of old buildings should be made to determine if any warrant some type of federal (or other) protection.
7. Further investigation should be conducted on the old metal water wheel on the Tongue River.

Archaeological Site Recommendations

1. An archaeological survey of the entire planning unit should be made as soon as possible, concentrating on coal deposit lands.
2. Until a complete survey is made, any action that will result in surface disturbance should be authorized only when there is assurance no archaeological values will be endangered.
3. Further investigation should be made on those sites recommended in the 1972 survey.
4. The sites located in the 1972 survey should remain undisturbed until a decision is made regarding the best management for each site.
5. Determine how best to protect valuable archaeological sites on private land, especially where threatened by land disturbance. Petroglyphs should be moved to an appropriate institution if faced with destruction.
6. Development interpretation of sites should be done only when exposure to the public will not endanger the values being preserved.

—From the Bureau of Land Management multi-resource analysis of the Decker-Birney area, 1972

Rosebud Battle, then, has meaning far beyond the fight itself.

MANY OTHER KEY SITES

The Decker-Birney area contains many key historic sites: the battle of Wolf Mountain; the place where Col. Joseph J. Reynolds traded blows with the Northern Cheyenne; the Crow and Assiniboine battle on the Old Dunning Ranch where the Crows wiped out the Assiniboines, except for a few survivors. These are traces of a past culture, but the stages of its passing still exist.

Although a knowledge of historical events can come from various sources—archives, visits to museums, examining old photographs, talking with old-timers who have witnessed an event—only through an actual visit to the site can one visually reconstruct and understand the past.

A visit to a historic site plays an important part in reinforcing knowledge about the past. Studying a battle arena as an Indian chief must have done, examining ancient petroglyphs, walking through a trading post and handling artifacts of earlier times can recapture the aura of the past as no history book can.

The great Crow Chief, Arapooish, probably best described the attributes of southeastern Montana: "The Crow country is a good country. The great Spirit has put it in exactly the right place . . . it has snowy mountains and sunny plains. . . . When the summer heat scorches the prairies, you can draw up under the mountains, where the air is sweet and cool, the grass is fresh and the bright streams come tumbling out of the snowbanks. There you can hunt the elk, the deer and the antelope . . . plenty of white bear and mountain sheep. In the autumn when your horses are fat and strong from the mountain pastures you can go down into the plains and hunt the buffalo and trap beaver. . . . When winter comes you can take shelter in the woody bottoms along the river. . . . There is no country like Crow country."

WHAT LIES AHEAD?

What does the future hold for the archaeology and history of southeastern Montana's coal lands? The BLM stressed study and protection of archaeological and historical sites in their management framework plan of the Decker-Birney study. (See box, page 18.)

The 1973 Montana Strip Mining and Reclamation Act also sets specific requirements to protect lands rich in history and culture. The law states, "The Department [of State Lands] shall not approve the application for prospecting or strip mining permit where the area of land described . . . [has] special, exceptional, critical, or unique characteristics, or that mining or prospecting on that area would, adversely affect the use, enjoyment, or fundamental character of neighboring land. . . . For the purposes of this act, land is defined as having such characteristics if it possesses special, exceptional, critical or unique . . . scenic, historic, archaeologic, topographic, geologic, ethnologic, scientific, cultural, or recreational significance. In applying this subsection, particular attention should be paid to the inadequate preservation previously accorded Plains Indian history and culture."

Behind the controversy over strip mining versus petroglyphs, tepee rings, buffalo jumps and historic battlefields, lurk the questions, "Why bother? Who are we for, people or petroglyphs? What are several hundred archaeological sites good for in comparison with the reported energy crisis?"

Answers to such questions are many and varied. A great number of people participate in historically oriented recreation. Many more derive vicarious pleasure from such recreation areas, just knowing, for example, that the battle site of Hanging Woman Creek remains.

One of the difficulties in trying to measure the aesthetic importance of the historical-archaeological factor is that we too often try to convert value, a subjective and varying concept, into price and cost which are objective and fixed. The value of a buffalo jump will not be the same for any two of us. It is a personal judgment and a final example of how it should be between man and antiquities.

The Plains Indians relinquished many ancestral titles and claims after agonizing conflicts between the Indians, settlers and the U.S. Army. They settled down to live out their lives in a world that had lost its meaning. The pomp and glory that was unrestrained movement on a spirited pinto and the freedom to starve under the whimsy of climatic hazards became a memory, a sad prelude to development of the prairies of southeastern Montana.

Whether certain key archaeological and historic sites will be further dissipated as memories in the coal spoil banks—through lack of interest and aggressive support—is entirely up to the public. The price of such historic and archaeological sites is finite; it is a matter of what we can or will pay. But the value is infinite. Making allowances for disparity in taste, experience and outlook, I do not think that I am alone or in a minority. These feelings have been, are and—I suspect—will be, one of the commonest marks of man.

If enough citizens believe such sites should be preserved, the job will be done. It is not too late.

THE ENERGY CRISIS:

by Hugh E. Palmer, President
Cardinal Petroleum Company

WHETHER ONE WISHES to acknowledge it or not, our nation today faces a serious shortage of available domestic energy. This is something new for the American people because they have always taken for granted adequate supplies of fuel and electricity.

This problem is particularly critical as it applies to petroleum and natural gas which currently satisfy 75 per cent of our nation's energy requirements. Because of a seriously depressed domestic petroleum industry, the United States has become increasingly dependent on foreign imports of crude oil and petroleum products. In 1973 more than one-third of our nation's daily requirements of 17-1/2 million barrels (700 million gallons) will come from foreign imports. Such dependence places the security of the United States in serious jeopardy and virtually allows those foreign countries which supply the oil to control our destiny.

How does it happen that our nation finds itself in such a critical and untenable position? The primary cause of the current shortage of domestic petroleum and natural gas can be traced directly to the depressed prices of these commodities paid to producers at the well head. Such depressed prices have resulted from the Federal Power Commission's control and regulation of interstate natural gas producers, and strong government pressures that continue to adversely influence the price of crude oil. As a result, investment capital applied to the search for new oil and gas deposits in the United States declined drastically during the last 17 years and resulted in a rather uniform decrease from 58,000 wells drilled in 1956 to 27,800 in 1971.

Cardinal Petroleum Company's opposition to both the federal regulation of natural gas and the removal of import controls on foreign crude oil is historic and well documented. Company management has always had the opinion that federal regulation of natural gas producers would inevitably result in an acute domestic natural gas shortage. It was Cardinal's contention that a more restrictive import program would result in a healthier domestic petroleum industry and less dependence on imported crude oil.

Studies indicate more undiscovered reserves of crude oil and natural gas exist in the United States. The search, however, will require huge capital expenditures which are unlikely to be forthcoming until gas production is removed from federal control and the well head prices for both oil and gas are allowed to seek their own levels as competitively produced commodities.

These actions alone will not solve completely the growing demand for energy in the United States. All natural resources with energy-producing potential will probably be used. Oil shales, tar sands, geothermal, solar, tides, winds, fuel cells, magnetohydrodynamics, reclamation of trash, hydroelectric and nuclear and breeder reactors may be called upon to collectively provide the energy needs of the future. But as of today, the one material that can best assist petroleum and natural gas in providing immediate energy needs is coal.

Without utilization of vast amounts of this solid fuel, it is extremely doubtful that the present standard of living in this country can be maintained. And what right does anyone have to deny future generations of Americans the standard of living enjoyed by those who preceded them, as long as this standard is obtainable through utilization of existing resources?

In order to do this, coal must be used. Therefore, the management of Cardinal Petroleum Company believes that a moratorium or ban on strip mining would not be in the best interests of the American people, and further believes that reasonable people, working cooperatively and constructively, will be able to arrive at reasonable safeguards to the environment in extraction and utilization of this vital energy source.

Cardinal's position does not stem from selfish interests because it has neither coal leases nor any vested interest in coal properties. It does, however, have a vested interest in the security of our nation and the well-being of its people. For some time now, Cardinal, along with other members of the domestic petroleum industry, has attempted to inform the public that a serious energy crunch was in the making. Too few people have been concerned enough to even listen.

It is our sincere hope that this brief article will enable the reader to better understand that the growing shortage of available domestic energy in the United States is not an imaginary problem. It is instead a stark reality that must be faced by the American people. Failure to do so could lower the standard of living for future generations of Americans.

(This is a condensed version of an earlier position paper. Copies of the original article may be obtained from Cardinal Petroleum Co., Box 1077, Billings, MT 59103.)

TWO OPPOSING VIEWS

by Willis B. Jones, Chairman
Montana Fish and Game Commission

JUDGING FROM READER response, the articles on the Montana coal situation have been well received. However, not all responses were complimentary. Some were, in fact, very critical.

This criticism centered on the situation known as the "energy crisis." Some charge that we are tampering with our nation's standard of living and may be invoking hardships on future generations.

Let's look briefly at the *energy crisis,* our *standard of living* and the *future well-being of our descendants.*

There can be little question that the present American life style is rapidly escalating energy demands. Multiplying this impact is the fact that the energy demand is rising approximately five times faster than our population. Statistics indicate the nation's energy demand now doubles every 14 years, with the demand for electricity doubling every 10 years.

Unfortunately more effort currently goes into preaching crisis than into serious energy conservation. A report released by the White House Office of Emergency Preparedness in September, 1972, estimates available conservation measures could reduce the nation's energy needs by 16 per cent by 1980 and 25 per cent by 1990. Within 10 years various conservation measures could save the country almost $11 billion per year, or the yearly equivalent of 7.3 million barrels of oil.

R. Buckminster Fuller, principal advocate of doing more with less, pointed out that the piston engine is 15 per cent efficient; the turbine engine, 30 per cent efficient, and the jet engine, 60 per cent efficient. He concluded, "There isn't any energy crisis, it's simply a crisis of ignorance."

Development of eastern Montana thermal electric power plants can make no claim to efficiency, delivering about 35 per cent of the coal's energy as electricity, with transmission and other losses still to be subtracted. With much of Montana's energy to be exported, our engineers and designers could well hang their heads in shame at the energy waste many of these developments represent.

If electric toothbrushes, aluminum cans, disposable containers, ten-miles-per-gallon vehicles and air conditioning rate high in your sense of values, then restrictions in the supply of energy will lower your standard of living. If, on the other hand, open space, clean air, clean water, productive land and abundant wildlife mean more to you, your present standard of living will continue only if energy consumption is curtailed. This curtailment will change—but need not lower—anyone's standard of living. It may actually elevate the standard by emphasizing certain amenities.

Certainly relevant to any discussion of living standards is the well-being of our descendants. While it is not our intention to interfere with anyone's opportunity to utilize a needed energy source, we cannot stand idly by while special interest groups lavishly and wastefully stimulate, and then meet, energy demands at the expense of Montana's environment and resources.

The time to conserve supplies and diversify sources is not when we run out of nonrenewable energy reserves, but when we have both the knowledge and ample reserves. Fossil fuel resources not consumed today represent a resource option available for future generations and more sophisticated technologies.

The environmental impact statement prepared for our first step into the national energy producing program (Colstrip Plants #1 and 2) has done little more than point out the inadequacies of our preparation. To guide and protect us in this industrialized journey to which coal has committed us, the 1973 legislature made substantial changes in the rules of development.

It must be acknowledged, however, that even with the most diligent utilization and enforcement of these laws, the strain on fish and wildlife populations will be substantial. Land will be altered and habitat consumed. Water will be diverted and consumed. Air emissions still baffle adequate control technologies. Transmission systems will march both east and west and across the breadth of Montana.

If there is a crisis in Montana, it is the crisis of change—a change in Montana's relationship to the rest of the states, a change in our traditional Montana way of life, and a change in our unique Montana standard of living. If you live here, it is as real and as important as any energy crisis.

We would have shunned our duty if we had not used MONTANA OUTDOORS to express our concern. If the future reveals reclamation not up to expectations or environmental controls failing to meet anticipated sophistication or siting, planning and zoning falling short of perfection, we will strengthen our stand. But, in any event, we will continue to defend our fish and wildlife resource with all the methods at our command, including more features in MONTANA OUTDOORS.

Improvements in irrigation systems can sometimes greatly reduce agricultural siltation. (F&G photo by Dave Wedum)

WATER

How two major industries can help "clean up" Montana's most prized natural resource.

by Dave Wedum

AGRICULTURE IS STILL Montana's number one industry. But recreation—of which sport fishing is a big part—is coming on fast and already ranks fourth.

In some places, farming and ranching practices rule out recreation. In other areas, these practices may have a serious effect on recreation many miles away. Sometimes this can't be avoided, but in many cases it can.

Montana's sport fishery depends heavily on the salmon family (trout and salmon) and wild fish produced in stream bed gravels of clean, aquatic environments.

Success of wild fish species requires modern stream management and adequate consideration of trout needs. That means: (1) maintaining the natural, physical stream channel, (2) insuring water quality and (3) obtaining enough water to support a sport fishery.

Regardless of water quality or quantity, an

In some watersheds, poor logging practices can adversely affect trout fishing. In others, where logging is properly planned, very little water quality degradation occurs. (F&G photo by Ron Marcoux)

Photo by Gus Wolfe

by Ron Marcoux

A CLEAR MOUNTAIN stream. An angler deftly drops his dry fly at the lower end of a sparkling riffle. Slight disturbance on the surface as the trout rises. Fisherman sets the hook. The fight is on.

The staccato buzz of a chain saw. A sawyer steps back to watch a tree fall. The saw hums again as he trims the limbs.

A road paralleling a stream. Reverberating roar of a logging truck breaking the silence. The driver of the diesel gears down to take a curve.

Unrelated scenes? No. Integrated parts of a relationship involving trees, loggers, streams, fish and fishermen.

The trees and the fish are vital parts of a watershed (a water production area). It produces the water that supports human activities downstream and sustains aquatic resources. Wild trout are an important part of that resource.

The amount and quality of water in the stream

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altered or destroyed natural channel results in serious depletion or possible elimination of higher aquatic life (fish). However, this doesn't lessen the importance of pure, unpolluted water in the stream.

Much of the water in Montana *is* polluted—with chemicals and agricultural, municipal, thermal and industrial wastes.

The single largest pollutant is *silt*. Construction projects, overgrazing, faulty logging practices, poor farming methods, irrigation returns and municipal drain sewers all pour silt into Montana's waters. The subtle changes in the aquatic environment caused by siltation are some of the most damaging to fish.

When most people think of water pollution and fish, they visualize dramatic "instant" kills of large numbers of fish floating "belly up" on the water's surface. Many of these fish kills have a short-term effect, and the overall aquatic environment is sometimes only temporarily harmed. They should be prevented, but often the publicity received is out of proportion to the permanent damage caused. Conversely, the accumulated long-term effects of siltation—which often go completely unnoticed and unchronicled—are much more damaging.

Members of the trout family are probably more delicate than most other Montana fish and their basic requirements are more exact and demanding. They have a limited tolerance to many physical and chemical factors. For trout to survive, they require high quality water, well oxygenated water, stream temperatures that remain below 70°F and clean gravel stream beds, free of sediment, where adult females can dig their spawning nests (redds). How does siltation affect this?

Streams often flood each spring. That's

Muddy Creek, near Vaughn. Siltation at its worst. (F&G photo by Dave Wedum)

LOGGING continued

governs trout survival and regulates the number of fish in the stream. Several trout species flourish in Montana watersheds. Only two—the Dolly Varden and the cutthroat trout—are native to western Montana waters. Some are migratory, moving from lakes into streams to spawn; others are resident and remain in a short section of the stream throughout their lives. The introduced and generally resident species include rainbow, brown and brook trout.

Now, how do the sawyer and trucker fit into our picture? What effect does removal of this and other trees have on the watershed, and subsequently on the trout? How is the tree removal related to the hydrologic processes of the watershed?

Trees intercept water from both rain and snow. Dense coniferous forests in snowpack regions (that form the headwaters of most western streams) intercept much water. Some of this water never reaches the ground, mainly because of evaporation. But rain water or snowmelt not lost through interception will either go directly into streams as surface run-off or be absorbed into the soil.

Surface run-off in spring causes high stream flows. The rain or snowmelt in the soil is held by soil particles. As additional water is absorbed, spaces between the soil particles fill. This water is used by forest plants; through metabolic processes such as transpiration (the giving off of moisture through a plant's leaves or other parts), it is returned to the air.

Once these soil spaces are filled, the water moves through the soil to stream or underground aquifers. These aquifers maintain stream flows during summer dry periods.

One example of where poor logging practices lowered water quality—Big Swamp Creek, Beaverhead National Forest. (F&G photo by Ron Marcoux)

nature's way. During high water, huge quantities of silt, mud and debris enter the stream. Because floods usually don't last very long and the volume and velocity of flows carrying the materials is high, this type of siltation does not create long-term detrimental effects to the stream. This is normal "geologic erosion" and it helps provide the needs of trout—deep pools, riffles and undercut banks. In the long run, it is beneficial.

Prolonged siltation or extremely heavy silt loads in normal or reduced water flows allows silt deposition in the channel and affects aquatic life in the stream. Any stream continually subjected to siltation contains an obvious scarcity of aquatic life.

Spawning trout lay their eggs in stream bed gravels. To hatch, the incubating eggs need high concentrations of oxygen and enough flowing water to wash away waste products given off in their development. Much of this needed oxygen comes from water percolating *through* the stream bed gravels and up and around the eggs, *not* by water flowing *over* the eggs. Silt fills the spaces between the gravel, permeability becomes lower and less water percolates through. The eggs get less oxygen. If siltation is serious enough, the eggs won't hatch. As silt deposition increases, the gravel bottom becomes unsuitable for spawning trout to deposit their eggs.

In addition to halting reproduction, siltation can affect food supplies. Aquatic insects, such as the stonefly, caddisfly and Mayfly, are produced in riffle areas and are a primary trout food. The larvae stages of many of these insects remain attached to rock and gravel and receive oxygen and food carried to them by flowing water. As the niches or spaces between, under and around the rocks and gravel fill with deposited silt, aquatic insects simply lose their places to attach. The food chain, thus broken, rapidly leads to collapse of higher life forms; in this case, trout.

Although turbidity (muddiness) of the water may not physically harm adult fish, elimination of spawning areas and a food reduction will, in time, eliminate or drastically reduce a stream's wild trout population.

Sediment pollution of a stream often is ac-

ABOUT THE AUTHOR

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What happens when timber is harvested in clearcutting blocks? As a timber management practice, clearcutting has been used extensively in recent years in Montana. In these cuts, trees are no longer present to intercept precipitation and the amount of rain and snow reaching the ground increases. The amount of water previously used by the trees or transpired back into the atmosphere goes into the soil. The increase in water volume fills the soil spaces quickly and seepage flows begin earlier. Once the soil is saturated, the water can only run off into streams. The combination of water seepage and surface run-off dramatically increases stream flows.

Several studies indicate clearcutting causes more rapid run-off and higher peak flows. These increases can adversely affect the fishery and the stream itself.

- More water in the stream moves more bottom materials or bedload down the channel and can dislodge fish eggs from redds (spawning nests), resulting in mortality of fish embryos.
- Bedload material may be deposited on top of redds, making it difficult for newly hatched trout to reach free-flowing water.
- Insects may be dislodged and crushed by the scouring of the stream bottom.
- Higher peak flows cause additional sedimentation by increasing the erosive energy of the water. Greater velocity usually means more erosion.
- Sediment settling and covering rocks eliminates needed food production areas.
- Higher flows tend to widen streams which decreases "deep water." And that decreases populations of larger trout.

The Fool Creek Watershed Study of the Fraser Experimental Forest, Colo., is an example of potential water increases. The watershed (39 per cent of it) was logged in checkerboard fashion with a series of cut and uncut blocks. Uncut areas were left to shade the cut blocks and slow down snowmelt. This cutting method increased total water run-off by 30 per cent, with most of it occurring during spring high water and very little during late summer and early fall.

Recent work on high elevations in the Rio

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companied by increased water temperatures. Agricultural methods affect water temperature by: (1) reducing stream flow by diverting water for irrigation, (2) removing stream bank vegetation which shaded the water and (3) returning irrigation waste water, heated as it washed over exposed fields.

Water must remain within certain temperature ranges for trout to survive. Even a slight rise in temperature can upset an entire "cold blooded" aquatic community that evolved within precise temperature limits. High water temperatures also mean less dissolved oxygen, which seriously affects most aquatic life.

Agriculture in its different aspects is the most widespread contributor of silt: removal of flood plain vegetation (particularly along the stream bank), overgrazing on range land, overirrigating, row crop production on steep sloping land and the use of machinery in streams (while making irrigation diversions).

An extreme example of agriculturally caused stream siltation occurs in the Great Falls area in north central Montana. Muddy Creek, aptly named, originates near Freezeout Lake in Teton County, south of Choteau. It flows generally southeast, entering the Sun River about 11 miles upstream from Great Falls near Vaughn. Natural water flows of the stream are seasonal and quite small but, because of its association with the Greenfield irrigation project (a major irrigation project in north central Montana on what is called the Fairfield Bench), it becomes a major stream during late spring and early summer of each year. The dumping of waste irrigation water from fields and canals and increased spring activity from percolation results in large discharges of water into this stream.

The siltation problems of Muddy Creek do not come primarily from soil washed off fields, but from the highly erosive and unstable quality of the stream bed and banks in its lower reaches. The valley floor and lower end of the stream consist of fine yellow and gray silt sediment up to 100 feet thick. In these last few miles of Muddy Creek, the stream erodes deep into its bed, cutting down as much as 20 feet, with extreme side-cutting and bank sloughing in other areas.

By the time Muddy Creek reaches the Sun River, it carries so much silt that virtually no aquatic organisms exist—a situation which is passed on to the lower Sun River. Discoloration

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Grande Watershed in southern Colorado showed a similar potential for delaying run-off.

But in Montana and neighboring states (Northern Region), techniques to enhance watersheds for fisheries *are not widely used* on forested lands.

Guidelines used by the Forest Service in the Northern Region generally allow for an increase in the peak stage of run-off. No general provisions exist for extending the peak or providing increased summer and winter flows to ultimately benefit the fisheries and other water users, such as irrigators and recreationists. Granted, this would require intensive evaluation of each drainage with emphasis on precipitation, slope aspects, vegetative types and elevation. But if the multiple use principle is to be obeyed, this work *must* become part of any timber harvest program. Although not governed by the federal Multiple Use Act, private logging operators also should be aware of their potential impact on streams.

Vegetation removal affects water temperature, which is critical for trout survival. A study in the Alsea River Watershed in Oregon illustrates this. Following complete removal of vegetation along a stream, the temperature increased from 61° F. to 86° F. A nearby watershed where stream bank vegetation was left intact showed no significant temperature increase. Although some trout and salmon are able to withstand water temperatures up to 78° F. for short periods, temperatures above 65° F. are considered detrimental to optimal growth and survival.

Temperature increases in tributary streams can also affect larger rivers. But what does a two-degree increase matter in a large river? In the Big Hole, for example, such an increase would mean a great deal. Lower stretches have recorded temperatures well above 70° F. Fortunately, these temperatures occur only for short periods on extremely warm days. The tributaries provide cooler water, keeping the river at a tolerable temperature. If for some reason (like improper logging) this cooler water wasn't added, Montana might lose the nationally known trout resource in these stretches of the Big Hole River.

Leaving a buffer strip or zone of vegetation along a stream not only maintains lower water temperatures, but it helps prevent organic debris from entering the stream. Organic debris uses oxygen as it decomposes.

Roads connected with logging activity gen-

from the silt still exists at Rainbow Dam on the Missouri River, nearly 20 stream miles away.

The U. S. Geological Survey maintains two stream measuring stations on Muddy Creek and the Bureau of Reclamation monitors the water quality effect of its projects. Yet, Muddy Creek and the lower Sun River remain virtually lifeless.

WAYS TO PREVENT AGRICULTURAL SILTATION

How can stream siltation from agriculture be reduced?

A number of control measures exist which could help improve areas such as the Greenfield irrigation project. Water delivery can be improved by lining canals and laterals, using closed conduits for water transportation, providing adequate control structures and requiring flow measuring devices. Improved management practices on the farm could help reduce waste water flows: use of new and more efficient irrigation methods, such as sprinklers in place of flood application; scientific irrigation scheduling to insure the proper timing and amount of water, and tail water (waste water) recovery and reuse.

A buffer strip of vegetation along the edge of a stream helps prevent stream bank erosion. If livestock graze nearby, the bank should be fenced. The farmer should not plant crops along the stream. Selective use of rock riprap (placing large rocks along a stream to prevent erosion) in *some* areas could prevent further stream bed erosion. Changes in grazing policy to prevent overgrazing are also necessary, with the end result of better forage production, less erosion and generally better use of the land.

Economic considerations are important to the farmer or rancher in selecting methods to guarantee more efficient operation. Too often either short-term considerations take precedence over long-term, or the individual has neither the time, money nor desire to make necessary improvements.

No state has a better potential for clean, unpolluted waters than Montana. With few exceptions, pollution from upstream sources is not a problem in Montana. The pollution of our streams, regardless of the source, comes from within the state. In a state where agriculture is the dominant industry, it is to be expected that agriculture will be a major contributor to the problem and, hopefully, to its solution.

This does not minimize other pollution factors nor does it mean there's no room for improvement. In the past we have treated our vital water resource carelessly. Now it's time to clean up the mess.

erally cause the greatest disturbance. Stream sedimentation, with the inevitable result of fewer fish, is caused by: lack of adequate drainage facilities, slumping because of construction in unstable soils and general soil movement because of lack of vegetative cover. Improperly placed culverts can become velocity barriers (making it impossible for trout to move from one area to another because of extremely fast flow) and eliminate necessary spawning areas. Bridges are more desirable because they do not create a barrier and the stream erosion caused by higher water velocity is lessened.

Water quality data is gathered in very few areas with active or potential logging. An exception is Rock Creek, one of Montana's blue ribbon trout streams. The Forest Service is collecting long-term water quality information on several selected tributaries. The data will be used for making land management decisions in this "blue ribbon" trout stream watershed. Information of this kind should be gathered from *all* watersheds where intensive logging is planned. Obviously, the appearance of a stream is a fairly reliable clue to what is occurring in the drainage. But quantitative and qualitative measurement is needed before techniques are changed or a deteriorating watershed is rehabilitated.

The environmental impact of logging must be recognized. In 1970, James Agee, a regional director of the Federal Water Pollution Control Administration (now called the Environmental Protection Agency), said, "Logging is one of the most serious sources of water pollution in the Pacific Northwest."

Another publication, by Richard Lantz of the Oregon State Game Commission, entitled "Guideline for Stream Protection in Logging Operations," explains in detail why certain logging practices are more desirable in protecting fish habitat and water quality.

Ultimately, timber harvest or vegetation manipulation can affect a fishery. Steve Yurich, Regional Forester for the Northern Region I Forest Service, sums up the need for this approach: "One great truth of this environmental age is that in using the land and its resources, it is in the long term far better to complement natural systems than to manipulate them for single purpose gain."

Let's hope the relationships between the trees, loggers, streams, fish and fishermen are fully explored. If adequate consideration is given by various land managers to watershed values which include fisheries and fish habitat, we can harvest both renewable resources—fish and wood—from the same watershed.

Should public money be spent on receation sites when private facilities provide the same services?

by Don Hyyppa

THIS WAS ASKED many times as Beavertail Hill State Recreation Area (east of Missoula, along the Clark Fork River) opened this May. It is a legitimate, important question, no doubt deserving much consideration. But there's more.

What did public money spent at Beavertail Hill buy for you? Should private enterprise have made the investment instead of this department? Should the site have been purchased or developed at all? Does it compete with private business?

Your money bought *permanent public access* to one-half mile of the Clark Fork River—which offers fine fishing or floating—and 65 acres of high quality recreation land. A trip to the site offers stately ponderosa pines, shaded cottonwood groves interspersed with grassy meadows and, at the south end of the area, a pristine, spring-fed pond. You can walk along the grassy river bank and fish with ease anywhere along the shore.

Your investment includes the cost of gravel roads to picnic and camp areas, rest room facilities and drinking water. You didn't buy luxury accommodations, only enough development to assure adequate health standards and to protect the site from misuse.

Unfortunately, your investment does not necessarily provide free use. It costs money to maintain and operate such sites, so a small ($2) overnight camping fee is charged.

The campground occupies only a small part of the 65 acres and campsites within it are generously spaced. Still, to assure you a quality nature experience and to ease pressures on a fragile resource, camping is restricted to the developed campsites. When these sites are full, late arrivals will be turned away.

Beavertail Hill has still more to offer: plenty of room to walk alone through the woods, watch birds, hunt mushrooms or wild flowers or sit in a sheltered spot by the pond and watch the wild critters go about their daily routine. If you live in Missoula or nearby, you can come out for an evening picnic barbeque with your neighbors or spend a cool, refreshing afternoon by the river.

WHOSE RESPONSIBILITY?

Should private enterprise have made the investment instead of this department? Perhaps a better question might be, *could* private enterprise provide a facility such as this? To answer, one must consider the objectives of developers of both private and public recreation areas.

The foremost objective of the private developer is economic return, without which his business could not survive. Unfortunately, the private campground owner often cannot control enough land to provide his patrons with a saleable amount of natural environment. Therefore, he must sell "services" and at the same time utilize his land to its maximum potential. Therefore, high density use is almost mandatory for his financial survival. This doesn't have to mean inferior development, but it does mean the recreational experience will differ from that provided by a development such as Beavertail Hill.

Knowing this, some private campground owners "specialize" by offering—and advertising—special attractions of their site. Examples include proximity to public land, guided wilderness camping and fishing trips, after-dark entertainment and other recreation.

The primary objective of a governmental recreation agency is to provide, within reasonable limits, recreation opportunities for all segments of the population including the less capable and handicapped and those of the lower income level.

One must also consider the "customers"—their wants and needs—to determine what kinds of recreational opportunities should be available.

Who are outdoor recreationists and what do they want?

THE PLAN

Personnel from the Department of Fish and Game, with the help of other state and federal agencies and private individuals, looked for an answer to these questions and others while researching "The Montana Statewide Outdoor Recreation Plan."

Researchers found most outdoor recreationists are mobile persons who demand quality sites and a quality experience. They prefer dispersed use and a natural environment, usually on or near water. A growing feeling exists that the opportunity to enjoy the out-of-doors at its best is the *inherent right* of all, not just the affluent, the healthy or the young adult.

The statewide survey showed the most frequent outdoor recreation activity was simply rest and relaxation (78 per cent). Many—but not all—outdoor recreationists camp (76 per cent). Fishing ranked third with 60 per cent trying their luck. Other activities, in order of percentage participating, included walking for pleasure, picnicking, sightseeing, hiking, driving for pleasure, swimming and boating and miscellaneous other activities. The survey respondents indicated their most *favored* or preferred outdoor recreation activities (but not necessarily the one they most often pursued) were fishing, rest and relaxation, camping, swimming, hiking, sightseeing, boating, walking for pleasure, water skiing and miscellaneous other activities, in that order.

Let's talk about campers. What do they want and need? Where are they likely to go to fulfill those wants and needs? Obviously, campers range from the wilderness backpacker to the man in the mobile home with hot running water and color television. Needs vary with equipment, physical and financial condition and the individual's particular definition of a quality camping experience.

Surveys show campers want to be near the activity that brought them to the out-of-doors in the first place. For example, most fishermen want to camp near the water. Next in importance is natural beauty; people not only want to be able to see it from afar, but also prefer to be surrounded by it. Camping opportunities which are near to home and convenient to the highway are also important.

Beavertail Hill State Recreation Area location and notes

Beavertail Hill State Recreation Area is located at the Beavertail interchange, off Interstate 90, 24 miles east of Missoula. The area is 1/2 mile south of the exit.

Of campers surveyed, 35 per cent had travel trailers, 24 per cent pickup or tent campers and 16 per cent had tents. The remaining 25 per cent used various other shelters, including sleeping under the stars.

Recreationists, including campers, represent a broad spectrum of the population, all of whom have the right to participate. They include all age groups, but most are from 45 to 64. Most have families and about 31 per cent are retired or unemployed. Most camp in the summer.

BACK ON BEAVERTAIL HILL

Does Beavertail Hill fulfill the role of a governmental recreation agency? We think so. Consider these points:

(1) It helps guarantee the opportunity for public recreation now and in the future.

(2) It provides a variety of activities including those most wanted by recreationists—rest and relaxation, camping, fishing, walking for pleasure, sightseeing and boating.

(3) It has spacious natural beauty, easy access and a convenient location.

(4) It can be enjoyed by most people.

Private enterprise might have used the same site, but could it provide the same opportunities? To make the business feasible, some money-making "services" would probably have been added—water, sewer and electrical utility hookups for trailers, hot showers, a laundry, restaurant, general store, kennel, recreation room, swimming pool or entertainment—and probably a much higher density of use.

Those things are necessary and should be available somewhere, but to install them at Beavertail Hill would change the site and type of available recreational opportunities. It would probably close the door to the less affluent and there is no guarantee the site would be there tomorrow for public use.

It seems unlikely that private enterprise could provide us with the same development at Beavertail Hill.

Should this recreation area have been built at all, by public or private sources? Again, surveys conducted for the Montana Statewide Outdoor Recreation Plan indicate an increased need for this kind of public facility. If recreational opportunities are to be available—now and in the future—to those unable to join private associations or unable to pay the price of admission to a private facility, land must be set aside now.

One might ask, "Why this particular site?" Unfortunately, we are not always able to choose. When alternatives do exist, the choice of sites

can be difficult. Price, location, size of parcel, aesthetic appeal, recreational opportunities, ease of access and many other considerations are part of the decision. In this case, however, highly desirable land was available in a high priority area. Public access to the Clark Fork is limited by terrain, manmade features such as Interstate 90, railroads and private holdings. To acquire a site as desirable as this, at the highway interchange, within a few miles of Missoula, is indeed lucky. The choice was easy this time.

COMPETITION WITH PRIVATE INTERESTS

Does Beavertail Hill compete with private campgrounds and recreational facilities in the vicinity?

To find out, examine these two examples:

• You and your family are on your way to Yellowstone Park and want to stop for the night.

If you require *no services*, you may go to the public area even though a fee is charged. There will probably be more room for the children to play and additional "semi-privacy" for you, even though private facilities are also of high quality. Competition? Yes.

If you want *services*, you will go to the private campground. Competition? No.

• You are looking for a place to stay a few days to relax and do a little fishing. You want quality, but can afford convenience and a little luxury.

If you find a private area close to the stream with a little shade and some natural beauty, as well as all the conveniences of leisure living, you will use it. Competition? No.

If that private site is across the highway or farther from the stream, and is a flat meadow with no trees and trailers are parked wall-to-wall, you may pass it up even though it has all the utilities, services and conveniences you originally wanted. Competition? Yes, but so is the private campground on the stream under the shade tree.

You may even stay at the private camp which provides the services you require and at the same time take advantage of the public river access and other outdoor opportunities offered at nearby Beavertail Hill. Competition? No.

RECREATIONAL DEVELOPMENT

Consider the following points about recreational development:

• Recreation use will continue to increase in Montana in the foreseeable future.

• The Department of Fish and Game is the only agency, state or federal, with any significant recreational development program projected over the next five years.

• Recreation land, especially along waterways and lakes, is rapidly disappearing into the hands of subdividers, private recreation associations and individuals. Some of the existing public land cannot be reached because of lack of access across private property.

• Outdoor recreation should be available to all, and many consider it an inherent right, and important to general health and well being.

• The Department of Fish and Game will continue to acquire and develop land with wildlife and unique, historic, cultural or recreational values. Acquisition in high priority areas will be emphasized and the department will capitalize on opportunities as they occur. Development will be limited to basic necessary facilities.

• The department will not construct camping facilities oriented primarily toward demand associated with travel on interstate or primary highway systems. In some instances, such as Beavertail Hill, natural areas with highly desirable recreational opportunities *are* adjacent to or near major highways. Such areas will be considered for a variety of recreational uses.

• The department will not construct camping facilities primarily for overnight convenience. It will endeavor, to the extent possible, to distinguish between a demand for recreation and a demand for services.

• The department will not in the foreseeable future construct elaborate convenience hookups for the more sophisticated recreational vehicles.

• We see the need for both public and private facilities. We do not expect, nor do we want, to compete with private developments which offer quality as well as service. Indeed, studies in Michigan indicate public campgrounds stimulate the market for the private developer.

Beavertail Hill State Recreation Area:

Public access to quality fishing and other recreation? Yes.

Public campground? Yes, but much more.

Unfair competition? We think not.

Should public money be spent on sites like Beavertail Hill? We think so.

ABOUT THE AUTHOR

Don Hyyppa, 33, has worked with the Montana Department of Fish and Game for 15 years. He is presently development planner for the Recreation and Parks Division.

THE OTHER HALF

A WOMAN'S LOOK AT CONSERVATION

by Kay Morton

Wildlife Group Picks President

Lynne Eggart was elected president of the Rosebud-Treasure Wildlife Association at the group's March meeting.

There's nothing unusual about a wildlife club electing officers, but the Treasure-Rosebud organization is larger than many with 302 members. It has been meeting for 35-40 years and Mrs. Eggart is the first woman to be elected president.

She comes to the position with excellent qualifications: a B.A. from Colby College in Waterville, Maine, with a major in biology; graduate school at Colorado State University in Fort Collins and part-time work as a research biologist for the Colorado Game, Fish and Parks Department while a graduate student.

She and her husband, Jim, have two children—Justin, four, and Quentin, two. They ranch on Tullock Creek, south of Big Horn in Treasure County. In addition to spending much time outdoors with various ranch duties, Mrs. Eggart enjoys leatherworking, photography and horseback riding.

Her election wasn't really a surprise, she says, because one works up through the ranks. The first vice president assumes the presidency, although nominations from the floor are allowed. She conducted her first meeting with her board of directors and it felt a little strange to be the only woman with 15 directors, plus the other male officers. "I hope—in time—they'll be able to regard me as just one of the boys," she said.

The club sponsors a dinner for graduates of the Hunter Safety

Lynne Eggart

Course. During the 1973 legislature, the association worked on legislation—especially strip mining bills—and submitted their suggestions and drafts of bills to district senators and representatives.

The club does extensive work to improve landowner/hunter relationships in the area. They prepared a map which lists ownership of all public and private land in Rosebud County. The project took more than a year to put together, and since certain parcels of land have changed hands since the project began, an addendum will be published soon. (The map is on sale from the association for $3.) She feels the guide is invaluable to hunters because they can easily locate a rancher on whose land they want to hunt and seek his permission.

One of her goals before her term expires in March 1975 is to get more women involved in the Wildlife Association's activities. Of the 302 members, only 44 are women. "Too many women think only their husbands should go off to meetings in the evenings. I think lots of women could benefit from our meetings and I hope more will come."

CARE AND FREEZING OF WILD MUSHROOMS

It's the season when some of you may take to the woods in search of wild mushrooms. There's a way to preserve them so you can enjoy the tasty morsels all winter.

Slice them in half, lengthwise, and rinse thoroughly. Place on a cookie sheet while still wet and immediately place in the freezer for one or two hours.

Each will freeze with a little ice "shell" around it. Place in freezer bags and replace in your freezer until needed. Before using, thaw and drain on clean dish towels. Use as you would freshly picked wild mushrooms.

Don't try to keep them in your freezer for longer than nine months.

SMOG AND VEGETABLES

How does smog affect the food value of corn, tomatoes, broccoli, spinach, lettuce, beets and carrots?

Research at the University of California, Riverside, may lead to an answer. The crops are planted in large plastic cylinders and grow in five different combinations of clean and smoggy air.

After harvest, the crops will be frozen in liquid nitrogen and shipped to a laboratory for analysis.

Studies already completed on citrus fruits exposed to smog show the smog didn't change the nutritive value of the fruit, but it decreased yields by about 50 per cent.

However, Dr. C. Ray Thompson, project director, believes root crops and leafy vegetables may show nutritional loss. Ozone in smog reduces photosynthesis which in turn could lessen sugar content of the crop.

"... the best definition [of a conservationist] is written not with a pen, but with an axe. It is a matter of what a man thinks about while chopping, or deciding what to chop. A conservationist is one who is humbly aware that with each stroke he is writing his signature on the face of his land." —*Aldo Leopold*

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PETUNIA PICKERS IN FOR BIG SURPRISE

Although it is now 19 years since I left Montana, the ties of my 33 years of residence there are still strong.

I had heard of the projected strip mining in the prairie states, but did not realize it had already started in Montana. What a tragedy! And just *what* can we do about it?

At our spring Tri-Valley Garden Club convention, I have been selected to give a talk. We elderly "clubbers" are supposed to be petunia-picking bird watchers! With the information you furnished and a fine article in the February 1973 SMITHSONIAN, I intend to give those nice ladies a lot to think about and worry over.

We have many problems in Wisconsin: denuded forests, pollution *ad nauseam*. But this strip mining is the very WORST.

My feeble efforts won't do much good, but at least I shall be doing something. Keep up your crusade.

Helene Cabell
Scandinavia, WI

ADVERTISING

We have been receiving your very interesting outdoor magazine for several months now, after we were introduced to it by one of your former residents.

We find that the state wildlife magazines are the only publications worth subscribing to nowadays. Many of the others are so full of advertising that you can hardly find the reading material.

We are also very interested in conservation, as well as the outdoors.

Frances V. Davis
Otis Orchards, WA

DEER HYBRIDS

I enjoy reading our fine Montana Fish and Game publication, MONTANA OUTDOORS.

I read an article in the March/April 1973 "Catchall" section called "A Blacktailed Whitetail?" This article was of great interest to me because, as far as I know, I am the only hunter who has ever taken a mature male in the so-called "hybrid" class.

This animal was photographed and checked for color, ear length, etc. by Steve Bayless (information bureau chief), who was at that time our resident game biologist in Havre.

Since that time I have seen another "hybrid" specimen and I took a picture of the difference in the tail of the mule, whitetail and "hybrid."

Gary Dusek, department planning ecologist, and I have had long and interesting discussions on the possible crossing of the two species.

Thanks again for doing a wonderful job.

Joe J. Pleskac
Havre, MT

LUMBER SUPPLY AND DEMAND

I would like to comment on your "Springboard for Discussion" in the March/April 1973 issue of MONTANA OUTDOORS about lumber exports and their relationship to lumber demand in the United States.

In 1971, the United States exported 1.2 billion cubic feet of lumber products. This same year, we imported 2.7 billion cubic feet. We import over twice as much lumber as we export. (From "Outlook for Meeting Future Timber Demand," U.S. Forest Service C18, December 1972.)

The lumber demand situation in this country is due to our own use. Our per capita consumption of forest products is greater than any other people on earth.

In the future, I doubt if we can rely on our present favorable import-export lumber situation in meeting our needs. Rather we'll have to either intensify forest management here, better utilize our available supplies, use substitutes (most substitutes have greater adverse environmental effects), or reduce our per capita consumption. The future will probably hold a combination of some or all of these alternatives.

Ross MacPherson
Bozeman, MT

MINING LAWS

I have been trying to follow the story of strip mining in Montana. Your troubles are just beginning. I do hope your state will pass laws with "teeth" so you can control the defects that are left by this sort of operation.

I wish you could see the terrible condition of many counties in southeastern Ohio. Yes, we had laws to control strip mining, but they could not be enforced. Company lawyers protected the company.

At the last session, the Legislature passed new laws that are supposed to have "teeth" so the companies can be controlled. The operators were supposed to fill in the excavations, but they did not. Some efforts were made to make some of these holes into lakes for fish, but the sulfuric acid in the coal killed the fish—until a way was found to neutralize this acid.

It is a large job. I hope you succeed.

Z. R. Prentiss
Akron, OH

NO DDT IN 20 YEARS

Regarding your article about the osprey, it seems that most of the blame for use of DDT is placed on Flathead cherry growers. Inquiries have been made and to their knowledge, DDT has not been used for at least 20 years.

Others could have used this spray such as the Forest Service and wheat and potato farmers. Why then place all the blame on the cherry growers?

An article should be written citing these other sources or retracting the blame on the cherry growers.

Charles B. Dixon
Bigfork, MT

AUTHOR'S INFORMATION QUESTIONED

I am writing about the article in the March/April 1973 MONTANA OUTDOORS, "Final Call for Montana's Finest Fisherman?"

It states that cherry growers on the

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east and south shores of Flathead Lake are using DDT and other harmful chemicals that contribute to the decline of the osprey. I am a teacher at Flathead High School and live on Flathead Lake. The cherry growers I know do not use DDT and other harmful chemicals as stated in the article.

Therefore, I would appreciate knowing where the authors got their information.

George Beyer
Flathead High School
Kalispell, MT

AUTHORS ANSWER CHERRY GROWERS

• The following letter is in response to several letters from the cherry growing industry concerning the use of pesticides. This exchange of ideas began in March, 1973 when MO published the results of a research project by these two graduate students—"Final Call for Montana's Finest Fisherman?" (Also, see "dear F&G," May/June 1973 issue.)—Ed.

Your letter to the editor (MO, May/June 1973) concerning our article was angry, bewildered, outraged, hurt, but thank heaven, articulate. At last, here is an organization representing the Flathead Lake Cherry Growers (or at least a plurality of them) unafraid to communicate with outsiders. If you only knew how glad we are to discover that!

You scathingly attacked us as "would-be ecologists" seeking to malign something we know nothing about—the cherry growers of Flathead Lake. Although we do not retract anything we said or wrote—as taken in context and as given to us—we are heartened to the skies by a cherry growers' organization actually sending us a message after what seemed like eons (actually 1966-1970) of furtive silence from cherry growers when anyone from the University of Montana Biological Station tried to get a simple answer from them.

Your organization, the Skidoo Packers, is but two years old. That explains why we may not have gotten your full story in 1968 (the year we concentrated on our pesticide-related data). The Skidoo Packers didn't exist in 1968.

During the summer of 1968, we called, visited, wrote, checked leads and sought facts of hard pesticide usage at Flathead in the past 30 years. For the most part (but for what you read in the article), this was in vain. If your organization had existed in 1968, and if we had sat down together and discussed the obvious facts (both pro and con for each faction) . . . well, the world would be going around a lot faster than it does.

I surely do hope that (from your letter) ". . . some of our large grower members are attempting to employ orchard practices that will eventually eliminate use of chemical fertilizers and pesticides. . . ." But what about those still lethal little guys? Sad but true, Flathead Lake's ospreys *do* show evidence of the debilitating effects of chlorinated hydrocarbons.

As you say, ospreys will pick up some of this contamination in their wintering ground; but in the past 30 years, hard pesticides *have* been used at Flathead (although, to everyone's credit, not in the recent past). Inexorably, some of this pesticide had to run off down the slopes of the Missions, into the lake, to be ingested by plankton, minnows and the bigger fish of the lake, with a triple-whammy dosage of any pesticide going directly to the osprey's fat supply.

We agree with this portion of your letter: "For goodness sake, let us all join the elite group of ecologists by sharing our problems and our goals." After all, nobody is the guy in the white hat anymore—neither we nor you—trying to louse up the environment or causing someone to lose his financial shirt. Meanwhile, each of us manages to do a little shirt-losing and environment-lousing-up as we try to do good in our own way. We'd like to hear more from your organization, the positive as well as negative, although it has been refreshing (in spite of the hot words) just to hear anything at all.

Your speaking out is a forward looking sign of the times to us. Maybe there is a friendly middle ground where we can meet and mutually learn.

You finished your letter by saying, "You can set the record straight by getting firsthand information on the use of DDT around Flathead Lake. . . ." If you would help us by directing us to that firsthand information (as well as being prepared yourselves, as we are, that as usual, the truth lies somewhere in between), we'll be more than willing to seek it out.

We're happy that there is now a cherry growers' organization willing to speak to everyone. I know you will have a growing number of listeners of all types, now that this astonishing secret is out.

Don and Doug MacCarter
Lakeville, MN

RECYCLED PAPER

In the March April 1973 MONTANA OUTDOORS, I read about people criticizing the use of recycled paper in different sections of the magazine. I also read where it was to be discontinued. For supposedly conservation-minded people concerned about the environment, I find this idea unbelievable.

How can we as sportsmen—ever convince the public of the importance of hunting, fishing and wise use of our natural resources, when we are appalled at having recycled paper used in our magazine? I wouldn't miss the look or feel of the new, glossy paper if I knew the old kind was helping conservation or if I could actually see conservation at work.

Let's keep up the fight for legislation on strip mining, pollution and other things that endanger the environment. Let's show our willingness to conserve our natural resources in any way possible, no matter how large or small. As the saying goes, "Conservation doesn't end with conversation."

Let's keep the recycled paper. I haven't seen any other state Fish and Game magazine which uses recycled paper or which compares to MONTANA OUTDOORS.

Thomas Osen
Livingston, MT

• You'll be pleased to note, Mr. Osen, that although we returned to use of glossy paper with the May/June issue, we still use recycled paper and plan to continue using it in the future.—Ed.

PRINTING QUALITY NO INSULT

I am absolutely appalled at James R. Duke's criticism of MO (March/April 1973, "dear F&G"). This individual has no understanding of your publication, is grossly uninformed, or is some sort of dupe.

Many of the more sophisticated publications are printed on nonglossy stock. Even a highly regarded Billy Graham book was printed on a nonglossy paper called Patina. MO's color reproductions rival those of that book.

Certain pages of MO are printed on recycled paper, which is not cheap. The advantage of its use is that 18 trees are saved per ton of recycled paper used. Duke shows no research in finding fault with MO and offers no constructive criticism.

From photography through typesetting to printing and binding operations, as well as editorially, you are

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dear F&G

to be congratulated for placing a fine product on the American market.

Duke complains of the printing quality as an insult to image. He had better study some points about graphic arts. His criticism of the cover is unwarranted; MO covers are most attractive. He and his friends are correct in considering MO "a reflection of Montana's quality and pride of being." Your magazine shows and sells Montana as it really is—a high compliment to the U.S.A.

If it is true you will discontinue the present nonglossy paper and not use any recycled stock such as you now do, you fail two ways: (1) you fall away from the sophisticated group of publications; (2) you discontinue tree conservation in using recycled paper.

A reader will find difficulty reading type from glossy paper due to light reflection. Often it is necessary to shift the magazine in order to see the print adequately when enameled or glossy stock is used.

Overall, MO is a fine asset to Montana. James R. Duke just doesn't know what he's writing about. I'll be happy to debate him anytime, anywhere, on the merits of MO. And incidentally, I represent nobody connected with MO, nor has anyone approached me to answer Duke's letter. I see MO as a fine magazine that greatly promotes Montana. Duke's letter tried to kill the cause.

George M. Cole
Helena, MT

MORE ON PAPER

I could not help but notice the article in the March/April 1973 issue from James Duke of Laurel, Mont., degrading your great magazine. I can't believe that everyone Mr. Duke talked to commented on the inferior printing and very poor quality of paper.

If Mr. Duke is an outdoorsman, I am sure he has many issues on his mind, such as your great articles on hunting, fishing, game birds, strip mining, lumber and timber cutting. To me, these things are a lot more important than the kind of paper used in the magazine.

I would like to suggest that Mr. Duke subscribe to COLORADO OUTDOORS and see what kind of magazine they produce every month, and how it's printed and on what kind of paper. In Missouri, we have a magazine called MISSOURI CONSERVATIONIST; it is an excellent magazine and I compare it with MONTANA OUTDOORS.

I am as much interested in changes in laws and environment of Montana as a resident. In 1970, I was fortunate to take a Boone and Crockett elk from Montana. I have since made three trips and have met guides and other Montana residents for whom I have great respect. There are no words to describe the beauty of your state.

I feel the reason for Mr. Duke's disturbance over the quality of paper used in your magazine is a personal and selfish one. He must be saving back issues to wallpaper one of the rooms in his personal residence; since you have changed the so-called quality of the magazine, maybe it doesn't blend in with the rest of his decor.

Again, thank you for such a fine magazine at a very reasonable price of $2 per year.

Harold F. Krieger, Jr.
Jefferson City, MO

MAN MUST SAVE THE OSPREY

I appreciated the article about the decline of osprey in the Flathead Lake area (March/April 1973 MONTANA OUTDOORS). As a resident of the area, the decreasing number of these magnificent birds of prey has been all too obvious and heartbreaking.

The osprey is found in nearly every part of the world and is in grave danger of extinction in many places. For example, on the Great Island Wildlife Area (at the mouth of the Connecticut River), the breeding population has decreased from about 200 pair in the early 1940s, to 71 pair in 1960, to fewer than 5 pair in 1972. DDT and other chlorinated hydrocarbons, through biological magnification, have become so concentrated in the osprey (as well as other birds) that their reproductive mechanisms are damaged. Despite high concentrations of pesticides in their systems, the birds instinctively continue their habits—laying eggs—but the shells are too thin to last through hatching or the embryos fail to develop.

Ironically, the same animal which brought the osprey to the brink of extinction must save it. Man must replace chlorinated hydrocarbons with less stable chemical compounds or, better yet, use biological controls if he is to save the osprey and many other endangered species (including man himself).

Your concern about this—and about strip mining and other such matters—is needed now more than ever before. Keep up the good work.

Cheryl Bauer
Zoology major
University of Montana
Missoula, MT

F&G MUST EDUCATE

In the March/April 1973 MONTANA OUTDOORS, Bill Schneider wrote an excellent editorial ("Old Wildlife Myths That Never Die"). In conclusion, he asked, "Is anyone listening," and "Will the old myths ever die?" My answer to these questions is, "Not unless we have a continuing program of education."

The Montana Department of Fish and Game is not educating enough. It has been about 20 years since Les Pengelly put on a good series of educational meetings here. Since then, an entire new generation of well-meaning, but ignorant, hunters has grown up. I have recently talked to quite a few citizens about scientific game management and have been shocked to find out how little the public knows about the basic principles.

People are receptive to truth, but how can they find it if the Department of Fish and Game doesn't tell them? Not just, "This is the way it is; you'd better believe it." The truth can't be told in just a few words. All over the state we need programs of four to eight sessions.

I say that a program of continuing education should be number one in priority—ahead of enforcement, access, fish raising, etc. The future of the whole conservation movement depends on proper education. Who knows, some of it may rub off on some sadly misinformed state senators and representatives. I pray to God it will.

Wes Bell
Lewistown, MT

MISPLACED COONEY RESERVOIR

Your location of Cooney Reservoir in the March/April 1973 MONTANA

POLICY ON LETTERS

Letters published in the "dear F&G" section of MONTANA OUTDOORS do not necessarily reflect the opinions and philosophies of the Montana Department of Fish and Game. They represent the author's feelings. We reserve the right to edit letters for length.

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OUTDOORS is way off. It isn't in southern Carbon County, which would make it south of Red Lodge. Its location is northwest of Red Lodge, or approximately 12 to 14 miles south of Columbus.

Charles W. Fink
Columbus, MT

HISTORY, EXPERIENCE BEST TEACHERS

My purpose in writing is to add my name to those favoring your position opposing the roadway through the Absaroka-Beartooth area. I believe very strongly that the area should remain whole or designated a Wilderness Area.

Secondly, I commend your position on strip mining in southeastern Montana. After reading the first two parts of "Montana Coal," I am frightened by the prospects this development promises. Surely we cannot delude ourselves into thinking the land can be reclaimed to its original productivity and habitat by far removed corporate heads who must ultimately answer to dollar seeking stockholders who could care less about the antelope in southeastern Montana. True, attempts will be made to reclaim the land, but when these fall short of original contractual promises—as they surely will—Montanans' only recourse will be the courts. I think those pleas will die there, just as the fish and wildlife died years before.

History and experience are our best teachers. Lessons on air pollution are taught each day. We know what will happen to Montana's air should the generating plants be allowed. Even if emission controls are improved and state and federal standards escalated, the results are still disgusting. Armed with experience, Montanans must take a positive stand and say *no* to generating plants on Montana soil.

I encourage the Montana legislature to do all within its power to ban the strip miners from southeastern Montana.

As the U.S. Army, the U.S. government, the gold seekers and the land grabbers robbed the Indians of their native lands, so do the strip miners threaten to rob Montanans of the land they love.

Richard J. DeGroot
Houston, TX

GARDENING WITHOUT POISONS, by Beatrice Trum Hunter, Houghton Mifflin Co., Boston, 1971, 318 pages, $6.95.

Gardening Without Poisons tells the age-old story of man disturbing nature's balance with unsound gardening practices and then attempting to reverse the situation by treating unhealthy soil with various chemicals.

The author describes effective alternatives (to using pesticides) for controlling insects, bacteria, fungi and other garden infestations. For example, many plants produce medicines which are natural bactericides and fungicides. Once a garden infestation is identified, these "medicine" plants can be used for control instead of using chemicals.

The advocate of biologically controlling unwanted plants will be interested in the author's position. Although a wide range of chemical weedicides and herbicides are used to suppress certain plants, she believes these chemicals are not only detrimental, but their use is based on ignorance of the importance of weed plants.

Gardening Without Poisons is a must reference for anyone interested in sound gardening practice using nature's own biological controls.—*Harley Yeager*

THE WAY OF A TROUT by R. P. Van Gytenbeek, J. B. Lippincott Co., Philadelphia and New York, 1972, 146 pages, $8.95.

The Way of a Trout is really two books in one.

Part I contains 44 large, color photos by James W. Wilkie, selected from the award-winning conservation film, "The Way of a Trout." The photos show the step-by-step development of rainbow trout eggs and fry. Also, they depict the hazardous life of a female rainbow from the time the egg is laid in the gravel of a woodland stream until she is a two-pound adult. Included are confrontations with predators: water scorpion, kingfisher, heron, merganser, otter and finally an angler who gently releases his prize.

These glorious pictures, many of them taken underwater, accompany a text by Dr. Albert Hazzard. Dr. Hazzard, one of the best known fisheries researchers in the United States, was an excellent choice of author to describe the world of the rainbow trout.

Part II by Pete Van Gytenbeek, executive director of Trout Unlimited, is a chronicle of TU's major battles to conserve our nation's remaining cold water fisheries. Also it's a ". . . blueprint for converting concern into effective action," as indicated by the headings: (1) Know the Enemy, (2) Know the Facts, (3) Know the Law, (4) Know the Alternatives, (5) Develop a *Schtick* [gimmick], (6) Cooperate, (7) Conserve and (8) Organize.

This book is factual and concise, yet it has an enthusiastic, easy-to-read style. Anyone interested in fish, fishing or conservation will mark as well spent the couple of hours needed to read *The Way of a Trout.*—*George D. Holton*

Next Time

Watch for these features in the September/October issue of MONTANA OUTDOORS

—waterfowl management
—hunting hen pheasants
—the mule deer
—early bull seasons
—favorite game recipes
—outfitter regulations

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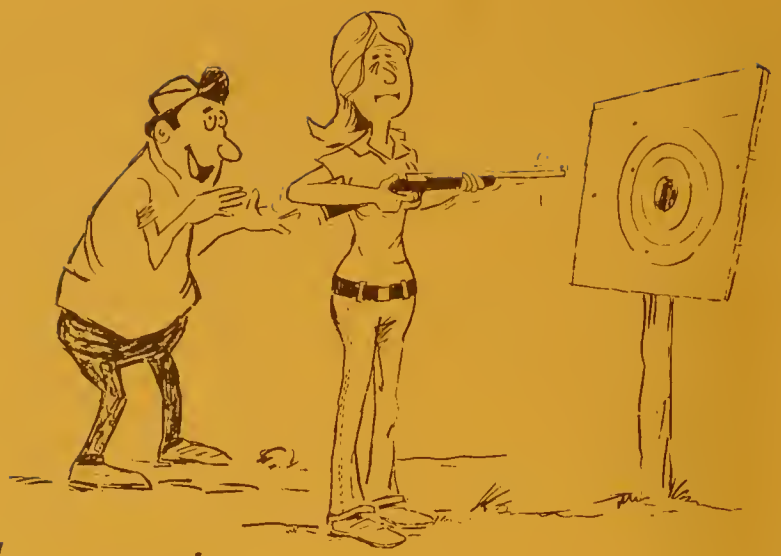
FOR MEN ONLY

by BOB CARROLL



teaching women to hunt

. . . requires a detailed game plan and a wee bit of deception.

AN INTERESTING PHENOMENON can be observed in hunting fields each fall. Many parked vehicles will contain one or more women talking, reading, doing their nails or just watching the world go by. In a stroke of genius, the observer realizes these ladies are "out hunting" but not actually hunting. Also, along that line one frequently notices an unarmed female walking, after a fashion, with bulldozer determination through thick cover like hawthorn, willows or near-impenetrable doghair. Curiosity, Phase II, enters, stimulated at the deeper meanings possible in such unlikely choices of navigational routes. Close scanning of the landscape, however, invariably reveals a man, seated comfortably in a position carefully chosen to take advantage of any game animal the woman may flush from cover.

Mulling these two bits of evidence provided by our own eyes, we automatically ask, "Why are these women, out hunting, but not hunting?"

We could logically ask the women. Instead, to assure the computer people they are loved and needed—lest they feel deprived—we will take surveys, samples, conduct circuitous interviews and turn 74 pounds, 3 ounces of raw data over to a systems analyst, requesting scenarios, alternative game plans and hopefully, some useful answers. Seven months later to the second (one programmer was sick and the other swore in Fortran which was rejected by Superbrain III), the button is pushed.

After one micro-micro-second contemplation, the earth shakes and the computer prints out: Women who go hunting with husbands and boy friends

(a) enjoy the companionship

(b) enjoy the outing

(c) why don't you ask a woman why the women who go hunting don't hunt?

So, the question was posed to numerous non-hunting female hunters.

WHY WOMEN DON'T HUNT

The answer was simple: someone once let them fire a gun and the experience verged on pure trauma. The woman had watched some sight-in, target, benchrest or "plinking" being done, from the cozy confines of a car parked some distance behind the shooter(s). She expressed some mild interest in the proceedings and was invited to try shooting. A .347 Earsplittenloudenboomer (ESLB) was placed in her hands.

When she pulled the trigger, several things happened: (1) the loosely held gun hit her shoulder so hard it turned blue, (2) her thumb hit her nose, bending it approximately 45 degrees to starboard, (3) the scope contacted her eyebrow and the healed scar has been a conversation piece ever since, and (4) the sudden contact between the rifle comb and her cheekbone caused her cheek to swell up, turn black and cause raised eyebrows all over town.

Data collected after such firings indicate: (1) 57 per cent of the time the rifle was dropped, a happening too painful to contemplate for most riflemen, (2) 100 per cent of the time the hus-

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band's supper was stale peanut butter on dry bread for a week and (3) 96 per cent were never persuaded to fire a gun again. The preceding scenario was labeled Game Plan I, and the computer printout asked if women should really be taught to hunt, pointing out that trained beaters and bird doggers are hard to find. It also suggested that a 12-gauge shotgun would be even better than a .347 ESLB.

Game Plan II follows in narrative form: "We return to the scene of the disaster at the instant the gal is handed the rifle. Behold, the .347 ESLB has been carefully put aside, with the rest of the Romp-Em-Stomp-Em centerfires and replaced with a lowly .22 rimfire. Although the stock is too long for the average woman, it is shorter than most centerfire rifle stocks because many .22s are often bought for boys. A suitable rest is cleverly provided so the lady can concentrate on aiming and shooting with a minimum of gymnastics. Using excellent forethought, the .22 has the same type of action as the big game rifle you have already decided to buy her next Christmas, birthday or anniversary. Since you have taken the Montana Hunter Safety Course, you have made sure the .22's action is open and no cartridges are within reach. You leave her admiring the stock finish while you put up some targets so big and close she can't possibly miss. Nothing succeeds like success!"

BOOM EQUALS FLINCH

From teeniest infancy we have been conditioned to jump, start or flinch when a loud noise assails our eardrums. Jumping and flinching are not conducive to good shooting. As a matter of fact, they are not even conducive to mediocre shooting. At this point, you do something that later earns you an honorary doctorate of psychology from six universities and 19 colleges. You hand her a pair of shooter's earplugs or muffs, knowing that many people equate noise with recoil.

All the solicitous attention lavished on the lady shooter is not going unnoticed. You give her a rudimentary explanation of the correct sight picture and have her dry-fire the .22 several times to get a feel of the trigger. You give her a cartridge and she is on her own. At the shot, the wise man will loudly proclaim (remember she's wearing earplugs), "Great shot, honey!" It may take some forbearance to watch her calmly shoot up the rest of your .22 cartridges. Game Plan II is proceeding well; she tried it and she liked it.

After the first session, you carefully cut the .22 stock so it fits her correctly. Being a real devil, you also take a rasp to the comb of the stock and made sure it positions her lovely face so that the sights are seen correctly when she shoulders the rifle. When she expresses concern that you are depriving yourself of a favored gun by altering it to fit her, you finesse, assuring her nothing is too good for the apple of your eye. (Old-timers will recognize this as groundwork for buying yourself another rifle later.)

As the shooting continues, you sneak the targets a little farther away and decrease their size. Her accuracy will increase with her enthusiasm.

In the very beginning, of course, you made sure the .22 carried the same kind of sights that her big game rifle will carry. There are three basic kinds of rifle sights. The old open sight looks deceptively simple. It is sturdy and cheap, and has remained almost unchanged since the 16th century. Its theory is fine, but in practice it forces the eye to attempt the impossible, namely to focus on three things at once: rear sight, front sight and target. A very young, keen eye can flit from one to the other well enough to allow a semblance of accuracy at short to moderate ranges.

Another kind of "iron" sight is the peep. For hunting the hole should be as large as possible and as close to the eye as practical. Good hunting accuracy can be obtained with an aperture up to one-quarter of an inch in diameter. The human eye naturally tends to center any object it looks at through a hole. With a peep the eye need only contend with putting the front sight on the target.

Growing in popularity is the scope sight. The novice shooter should start with a scope of 2-1/2 or 3 power. Good scopes are bright, and you can really see what you are looking at. The sight picture appears in a single optical plane, so the eye has no focusing contortions to go through. Scopes nowadays are as sturdy and reliable as iron sights.

LADY TO FARMER'S RESCUE

When your lady has hit her target ten times in a row at fifty yards, she is eased into shooting without a rest. Rather than using paper targets, you have been using targets that *do* something when hit. Prior to recycling, cans jump, twirl and fall over when hit and the shooter sees instant results. This is also the time to introduce her to

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Bob Carroll wrote this story while he was program director for the department's audio-visual section. Since then, he has taken a position with a private ecological consulting firm.

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women to hunt continued

hunting on a mini-scale. With deft statesmanship you describe gophers as ultranumerous rodents, virtually carpeting certain meadows with holes dangerous to livestock and eating choice grass seeds necessary for farmers to remain viable in their ecological niches. The farmer needs help. Naturally you have a friendly farmer in mind, a shooter himself, who will document your assertions. The sight of a dead gopher being eaten by his brothers has a certain repulsiveness about it, and ladies find a certain satisfaction in sending .22 bullets at the cannibals.

An intermediate step in the path from small game to big game hunting is the jackrabbit. One hunts jackrabbits for the same reason one hunts gophers, and don't forget that birds of prey and carnivores will likely be along to clean up the carcasses when the turmoil has died down. In a sense you are doing conservation a good turn by taking a coyote out to lunch.

About the time budding Annie Oakley bags her first running jackrabbit, another educational step is taken. You find a buddy with a wife or girl friend who has mastered venison cookery. Delectably cooked venison is possible because your buddy is an expert in field dressing big game. You arrange an invitation to supper and —you guessed it—the piece de resistance is venison. Over after-dinner libations, you engage your buddy in conversation about deer, being sure the ladies are within earshot. This is the place to remark that such an excellent tasting deer certainly must have come from an area of lush deer food and adequate winter range. Being an expert outdoorsman, he will answer that the deer in his favorite hunting area are superb because of balanced harvests each fall. Soon your student will announce she is going to go deer hunting with you. The time has come; she needs a rifle.

DON'T OVERGUN HER

The first problem to solve in rifle shopping is the question of caliber. Most men go afield considerably overgunned for deer. At some time or another they may hunt bear, elk, moose or other tough game under conditions which require a rifle of considerable power. But the lady, starting to hunt, should concentrate on deer.

Game Plan II offers two routes. If you are a handloader and certain of her continued enthusiasm for hunting, you can choose a caliber or cartridge considered adequate for elk or bear. This would include the .25-06, .270, 7 mm magnum, .30-06 and similar cartridges. You could then load these down to more acceptable recoil levels while retaining plenty of energy for deer. A disadvantage is that more powerful rifles are usually heavier.

The second route is to get her a rifle in the strictly deer-antelope-black bear caliber class. These would include the .243, 6 mm, .250-3000, .257 Roberts or 7x57mm. These numbers are characterized by low recoil, but will take larger game with the proper bullets and expert shooting. Their speed is such that the trajectory is very flat over normal hunting ranges. This makes hitting easier as women rarely master trajectory and ballistic charts or hold-over information. (And you realize adding a thick, slip-on recoil pad will lengthen her stock so you can use it for varmint hunting.)

Bagging any game animal with one shot is about 70 per cent shot placement, 25 per cent correct choice of bullet and 5 per cent caliber. Arming your sweet with a .30-06 or 7 mm magnum is pure folly and will undo all the careful groundwork you've prepared. Once again, the stock must fit the woman and be shaped to give her correct cheek support for the sight being used. Besides, it is well documented in hunting circles that a rifle weighing 8 pounds at sunup weighs 28 pounds at sundown. Milady will invariably prefer a lighter rifle.

As familiarization with the new rifle continues, the ethics of sportsmanship are mentioned. A casual accounting of how it's more important to place the right bullet in the right place so that one shot is enough will be considered admirable. The enjoyment of the hunt, more than bringing home game, should be stressed, lest a missed shot produce a crestfallen huntress. Signing up for the Hunter Safety Course should be praised warmly.

The big day arrives; she gets her deer. Now, bring up field dressing. Equip her with a sharp knife and get the deer in position, then stand back and give advice, now and then making a short demonstration. Rare is the woman who has not handled meat in the kitchen. Your talk should explain that field dressing is one step ahead of preparing meat for cooking.

When she catches and pockets empty brass between shots, you know you have not only a huntress but a shooter! Of course, you now find yourself doing fifty per cent of the bird dogging, and, alas, sometimes being outshot. On the other hand, she has discovered a pleasant and fulfilling sport and will appreciate you all the more for it (especially if you never tell her you had it planned all along).

Who knows, she may even give *you* a new rifle for Christmas, your birthday or anniversary.

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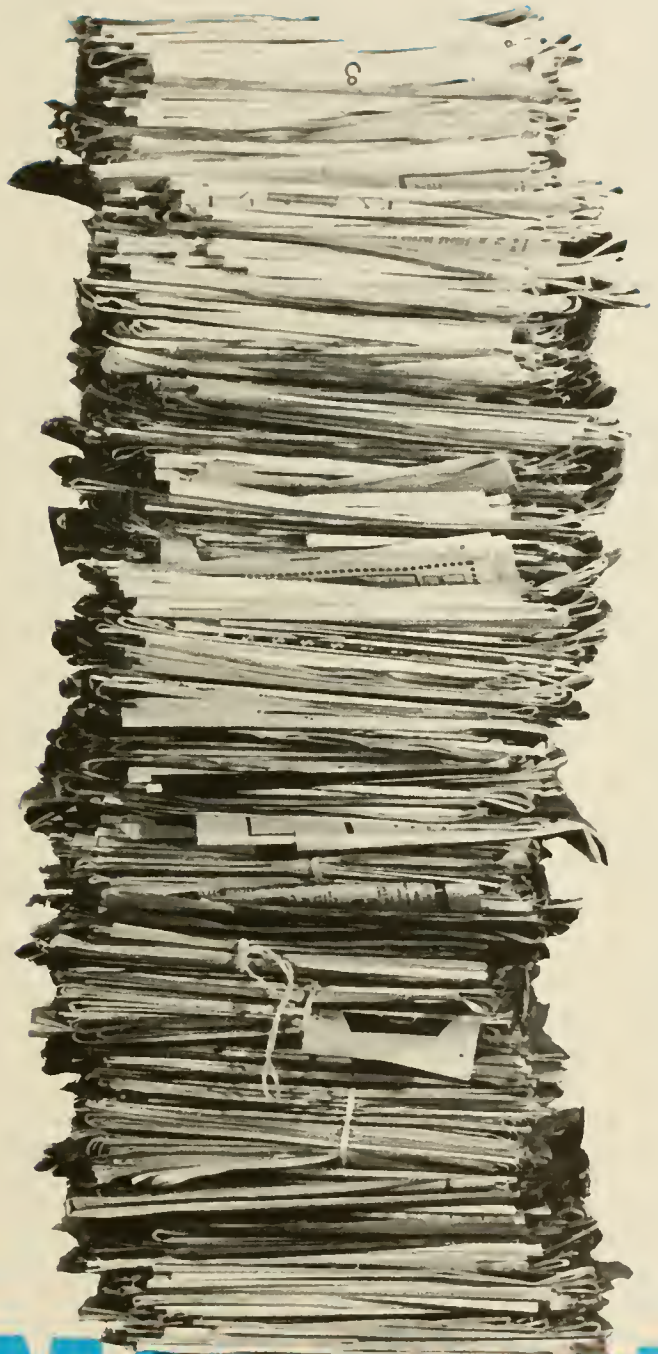
RECYCLING

Is it finally beginning to work?

by Kay Marton



THE EARTH IS a spaceship. On a spaceship there is no "away" to throw things to.

Yet in his lifetime, the average American will throw "away" 10,000 non-returnable bottles, 17,500 cans, 27,000 bottle caps, 2.3 automobiles, 25 rubber tires and 126 tons of paper, food wastes and cloth. Multiplying these figures by 204-205 million (the 1970 census figure for the United States) produces some truly astonishing statistics.

Each year we throw away more and more. In 1920, we threw away about 2.75 pounds of waste per person per day. Today it's up to about five pounds and by 1980, it's projected that Americans will throw away a staggering eight pounds of refuse per person per day.

For most people, garbage is brown paper grocery sacks stacked in galvanized containers outside the back door once or twice a week. The next time sacks are taken out, the refuse placed in the cans earlier has disappeared. That's all there is to the garbage problem.

How many people even know where

MONTANA

their garbage goes? Most likely, it goes to one of three places: a dump, incinerator or sanitary landfill.

Cities usually choose the cheapest method of disposal. Perhaps that's why about 84 per cent of the nation's municipal refuse ends up in dumps, 8 per cent in incinerators and 6 per cent in sanitary landfills.

TRASH TECHNOLOGY

Some 14,000 communities still put their trash in dumps, evidence that being able to send men to the moon hasn't affected trash technology very much in the last 100 years. It *is* cheap at about 25¢ per ton post-collection cost. But dumps aren't very satisfactory because they look awful and smell worse; they provide a breeding ground for rats, flies and disease; pollute streams and groundwater, and where the refuse is burned regularly, they contribute heavily to air pollution.

Of the approximately 300 large and 200 smaller incinerators used in this country, 75 per cent burn without even basic air pollution control equipment. A solid waste problem becomes an air pollution problem. Incineration is also expensive, at $8 per ton.

A sanitary landfill is a means of compacting and burying solid wastes. It costs less to start (about $3 per ton) than an incineration system, and a sanitary landfill won't burn, doesn't cause odors, spread litter or breed pests—as long as the day's deposits are adequately compacted and covered. When completed, landfill areas can be used for golf courses, baseball diamonds or parks. However, the landfill takes a long time to settle and requires maintenance while doing so. Another problem with the landfill is finding cheap, accessible land near the city so transportation costs are low. Such land becomes harder and harder to find. Sometimes the chosen site is irreplaceable swamp and wetland—valuable wildlife habitat. And unless the landfill is properly located, groundwater can be polluted.

Solid waste increases go hand in hand with population growth and jumps in per capita consumption. Each year Americans generate about 360 million tons of municipal and industrial wastes —enough garbage to bury the entire state of Connecticut a foot deep. Of this total, some 170 million tons isn't collected. It's dumped by the side of the road, flushed down the toilet, swished down the drain or it goes up in smoke in the living room fireplace. The other 190 million tons is collected. The National Center for Resource Recovery reported that collection cost about $4.5 billion in 1971; on a list of national expenditures, only schools and roads cost more. This 190 million tons is causing dumps, incinerators and landfills to overflow.

MONTANA'S SITUATION

How does Montana's solid waste problem compare with the national picture? According to a study released by the Department of Health in 1971, the amount of solid waste produced by each Montanan closely approaches the national average. The 682,133 persons in the state (1970 census) generated 858 tons of solid waste per day. That averages out to 7.5 pounds per day per person, an unusually high figure. But some 3.2 million tourists poured through Montana in 1969 and contributed to the elevated figure by producing about 1.5 pounds of solid waste per person per day.

According to Terry Carmody, project coordinator for the Solid Waste Section, Bureau of Environmental Services, Montana has 514 communities. In July 1972 some 50 sanitary landfills operated and 55 per cent of Montana's people sent their garbage to a landfill. However, Montana still has 450 dumps. Some of these are small, Carmody points out, and serve communities with only 15 or 20 people.

By July 1, 1973, all communities with populations over 1,000 must convert to sanitary landfills. Carmody estimates that 61 per cent of Montana's people will then be served by sanitary landfills.

Montana has no municipal incinerators, but some grocery stores and lumber operations have their own "in-house" incinerators.

Carmody estimates that Helena residents and industries dump about 100 tons of garbage per day into Helena's sanitary landfill. (He noted that Helena was one of the few cities in the state with plans to use a sanitary landfill for the community's benefit. A recreational complex is planned for the landfill area.) He estimates that Great Falls generates 100-150 tons of solid waste per day and Billings more than 200 tons.

He said location of landfills isn't a real problem in Montana yet, since many landfills are placed on federal lands. But, most people don't want a landfill near them because they still equate "sanitary landfill" with "dump." He said his department is working to inform people that a sanitary landfill is cleaner and more efficient than the old smoldering city dump.

ABOUT THE AUTHOR

Kay Morton, 28, was graduated from the University of Montana, Missoula, in 1967 with a B.A. in journalism and has completed four quarters of graduate work toward her M.A. She joined MONTANA OUTDOORS in January as editorial assistant.

Montana doesn't have to face the problems of more populated areas—yet. If two Missoula men have their way, Montanans may learn to utilize and reuse waste.

RECYCLING IN MONTANA

Mark Richlen and Doug Stewart opened the Missoula Recycling Center in October 1971. The two dropouts from the University of Montana School of Business also opened centers in Billings, Bozeman, Butte, Great Falls and Livingston. Helena and Kalispell come next, they say.

The two were students in a business school in search of a business that would allow room for environmental concern. They talked to many people all over the country—officials from Reynolds Aluminum, Hoerner-Waldorf and from paper mills in Chicago, Minneapolis and St. Paul—and hit upon a recycling center as a way to earn a modest living and do something for the environment at the same time.

They don't plan to stop with centers in Montana's major cities. Weekend centers are scheduled for Miles City, Glendive, Sidney and Lewistown. "Box systems" will be instituted in smaller towns and operated by public service groups. Labeled boxes (aluminum cans, glass bottles, newspapers) will be provided in which residents can place recyclables.

All recycling centers will accept aluminum cans, glass beer and soft drink bottles and newspapers.

The journey of the aluminum can—from the recycling center to the recycled product—previously was a long and expensive one. The uncrushed cans were packed in large plastic sacks and hauled by truck to a large recycling center in Seattle. The cans were shredded and shipped by rail to Reynolds Aluminum in Alabama. Realizing the many steps and miles involved, Richlen said, "It became a problem of relative energy. It took gasoline to drive a truck to Seattle. It took more energy to power a train to Alabama. We began to wonder if our can recycling project was a negative or positive thing."

That all changed with arrival of a $5,000 shredder in late May. The wheel-mounted shredder gobbles up some 500 pounds of aluminum cans per hour. The shredder can be pulled by trailer to gobble up cans at the other centers. The shredded aluminum then goes directly from Missoula to the Alabama Reynolds plant where it becomes siding, tubing for outdoor lawn furniture, or aluminum ingots. Center patrons receive 10 cents per pound.

A boxcar holds about 60,000 pounds of shredded aluminum. In an average week, the Missoula center collects 6,000 pounds of aluminum cans. In a good summer month, more than 8,000 pounds might be collected per week in Missoula alone. Future plans include a shredder to handle paper and "tin" cans (which are actually steel with a tin lining).

Glass beer bottles go back to the brewery where they were filled. Beer distributors who help out by accepting their own bottles back for recycling include Lucky Lager, Rainier, Olympia, Heidelberg, Rheinlander, Great Falls Select and Tuborg. The center pays 25 cents per case of glass beer bottles. The bottle collection tends to be a hit and miss affair, Stewart says. If a truck comes through bound for a Washington brewery, for example, it stops at the center and picks up its bottles.

Since December 1, 1972, the center in Missoula has collected about 180,000 pounds of newspapers. The newsprint goes to Bighorn Gypsum Co. in Cody, Wyo., where it is used in production of wallboard. The waste paper is repulped (but not deinked) and put in wallboard mixed with 95-99 per cent gypsum. Pulp from the newsprint strengthens the brittle gypsum.

The center pays $4 per ton or 1 cent per five pounds of newspapers. Bighorn Gypsum pays them about $20 per ton. It sounds like they make a great deal of money, but it costs 40 cents per hundred pounds to ship the papers the 439 miles to Cody, via Burlington Northern Railway. The only reason there's any profit at all is because BN gives the centers a break: they cut the usual freight rate of 80 cents per hundred pounds in half.

It's fortunate Montana has the Bighorn Gypsum market because the situation doesn't look too bright elsewhere. Nationally, newspapers account for about seven per cent of *domestic* solid wastes and four per cent of *all* solid wastes. Of the 10 million tons of newsprint used yearly, only about 23 per cent is recycled.

Another advantage to the Bighorn Gypsum process is that the color of the wallboard doesn't matter. Deinking processes are required to obtain a near white color in recycled papers. In a plant using 330 to 345 tons of old newsprint daily, some 4.5 million gallons of fresh water would be necessary. In addition, 2.7 million gallons of effluent, including 71 tons of organic matter—such as fiber and ink chemicals—would require disposal.

MONTANA'S NEWSPRINT CONSUMPTION

According to an article by James M. Edwards in MONTANA BUSINESS QUARTERLY (Sum-

mer 1972), newsprint consumption in Montana in 1971 was 12,000 tons. For newspaper recycling, a participation rate from 12-35 per cent of subscribers is usual. What does this mean in Helena? If the maximum percentage (35 per cent) of Helena subscribers participated in recycling the 553 tons of newsprint used by the HELENA INDEPENDENT RECORD in 1971, 193 tons of newsprint would be reused.

Garden State Paper Co., with three main plants, is the pioneer in recycling newspapers. All three plants are located near large urban centers where much newsprint is available. A small recycling plant producing 300 tons of recycled newsprint per day would require 350 tons of waste newsprint, a supply which could be filled only in a large metropolitan area.

One of the Garden State mills (Pomona, Calif.) receives about 8,300 tons of waste newspaper per month. Montana would generate enough newsprint to keep such a center operating less than one month per year.

Markets for Montana's recyclables may be limited, but the center in Missoula is growing. From November 1971-November 1972, the number of bottles and cans processed increased 235 per cent. From January 1972-January 1973, the increase jumped to 346 per cent. Part of the reason, no doubt, is that Richlen and Stewart spend their time doing more than feeding aluminum cans to their new shredder. They talk to women's clubs, business classes at the University of Montana, meetings of League of Women Voters, Optimists, Lions—and make presentations to just about anyone who wants to know about recycling. They conduct tours for Brownies, Boy Scouts, Girl Scouts. They travel around the state and talk to their managers at the various centers about problems.

The two regard recycling as the answer to solid waste problems. Stewart said, "Recycling can result in production of energy and reclamation of metals. The amount of usable material that is simply plowed under the ground is amazing."

But it's easier and cheaper to plow it under the ground than to reuse it. Before resource recovery can work on a large scale, incentives for industrial consumption of waste materials must increase. Secondary materials must become cheaper than virgin resources—or virgin resources must become more expensive relative to raw materials coming from wastes.

Thousands of communities throw away tons of aluminum, steel and other materials. These communities then ship into their industrial plants these same materials—from Africa, Latin America or the western United States. Production of one ton of aluminum from raw materials requires about 17,000 kilowatt hours of electric energy. One ton of aluminum from recycled cans requires only 187 kilowatt hours. Recycling an aluminum can takes only five per cent of the energy it took to make the can in the first place.

But, it costs 2-1/2 times as much to ship a ton of steel iron scrap by rail as it does to ship a ton of raw iron ore. That's hardly an incentive to use scrap iron.

NIXON VS. RECYCLING

The Nixon Administration has done nothing to further recycling efforts and create industrial incentives for using recycled materials. According to CONSERVATION NEWS (March 1, 1973), the budget for fiscal year 1974 cuts more than $24 million from a request for $30 million by the Environmental Protection Agency's (EPA) Office of Solid Waste Management. That leaves about $5.8 million and most of that will be spent to manage toxic industrial wastes.

Included in cuts are proposed subsidies designed to enlarge the nation's markets for recycled materials. The cuts ignored an EPA report which made suggestions to solve the country's solid waste problems. The report didn't emerge from the President's Office of Management and Budget, the article reports.

Also, the Administration didn't use (and doesn't plan to) $6 million of the 1973 appropriation. The rationale is that solid waste management should be largely a state and local matter. The cuts substantially reduce EPA's role in recycling. The agency no longer can make grants

RECYCLING CENTERS

Addresses and hours of Montana's major recycling centers:

Billings—3517 First Avenue South
Bozeman—725 East Cottonwood
Butte—1015 South Montana
Great Falls—815 Second Street South
Livingston—corner of Park and "B" streets
Missoula—901 Toole

All centers, except Livingston, are open Monday, Wednesday and Friday from 10 a.m.-7 p.m. and Saturday from 9 a.m.-5 p.m. The Livingston center is open Tuesday and Thursday from noon-6 p.m.

recycling tips

If you work in an office, use the reverse side of old letters, manuscripts, etc. for working copies, notes or rough drafts.

* * *

Use paper straws instead of plastic. Or, better yet, use no straws at all.

* * *

Use a sponge instead of paper towels to wipe up spills.

* * *

Use single-ply white toilet paper. Dyes pollute.

Throw a party or reception without the usual paper tablecloth, napkins, cups and plates. If you must use some disposable items, at least use noncoated paper items. Noncoated paper decomposes rapidly and burns easily.

Don't regularly use disposable or plastic plates and utensils.

* * *

Don't buy individually wrapped slices of cheese, pieces of candy or even vegetables that are sealed in plastic wrap.

* * *

Save used jars and lids. If you don't can, give them to someone who does. They're fine for certain kinds of pickles and relishes.

to states or localities for planned waste disposal projects nor for training people to manage them. The agency no longer will be able to make grants for "demonstration" projects for resource recovery; for example, how some solid waste recovery techniques and burning of municipal garbage can ease the growing energy shortage.

SOLUTIONS TO ENERGY WASTE

Some cities and states are looking at energy and waste and doing things on their own, some with EPA funds and support.

An Oregon law went into effect in October 1972 to eliminate aluminum pull-tab cans and require returnable containers with a refund value of at least five cents each. So, it simply *pays* to recycle. However, it must be pointed out that collection hasn't been coordinated very effectively with actual recycling efforts and grocery stores have reported sanitation problems. A similar law was killed in a House of Representatives committee in Montana's 1973 legislature.

A plant in Baltimore daily converts 1,000 tons of solid waste into synthetic gas to make steam for electricity. Another plant in Lowell, Mass., recovers ferrous metals and glass from incinerator residue and then sells the metals and glass. Annual revenue is expected to be $500,000.

In April 1972 an investor-owned utility in St. Louis began to burn municipal solid waste as fuel for direct production of electric power. The refuse is shredded and ferrous metals removed. Pulverized soft coal is then mixed with it in about a 9:1 ratio. (See MO, May/June 1973.) A valuable product—energy—is thus created from garbage.

Expo '74 in Spokane, Wash., will pave a permanent park plaza with "glasphalt" (a paving material similar to asphalt except crushed glass is used instead of sand). The Exposition plaza will also use outdoor furniture and equipment made from recycled aluminum.

Chicago should receive credit for trying. That city has to face the problem of 1.5 billion gallons of raw waste flushed into the city's sewers every day. In the past, Chicago sold tons of dried sludge to Florida citrus growers as fertilizer. Drying the waste was expensive and caused air pollution; trying to use the waste undried was unsuccessful. Although U.S. farmers use animal manure, the thought of using human manure was too much to take. Then it was found that sludge was easy to spray where needed with standard irrigation equipment and did not smell bad. Better yet, used as a soil nutrient, it caused clay and sandy soils to become more productive. Finally a coal stripping company in Illinois bought the sludge. They experimented with some 7,000 acres of unreclaimed strip mined land and planted it in corn. Corn treated with sludge grew eight feet tall. Stalks on untreated land were only three feet high. Salvation for a ruined landscape may make recycling sewage wastes a profitable industry. Perhaps even in Montana.

The nation's every increasing daily output of garbage is both a crisis and an opportunity. Solutions to the problem can yield profits: conserved and marketable natural resources, not to mention new energy sources. One can't help wonder what would happen if the problem of solid wastes was approached with the technological expertise and financial backing of space or military programs. Possibly, no garbage would be left to dispose of.

Until that happens, we are stuck with Paul Swatek's *(The User's Guide to the Protection of the Environment)* thought: "Everything comes from somewhere and everything ends up somewhere." On a spaceship, both somewheres are the same place.

editorial

WHY WE SHOULD WORRY ABOUT THE BROWN PELICAN

There was a time, not long ago in evolutionary perspective, when all men lived on the wild production of the land. Today, most Americans in our plasticized country know only of supermarkets, cans, supplements, stimulants, chemicals and other artificial things. Only vaguely do we acknowledge the presence of pig factories, feed lots, slaughterhouses, chicken assembly lines and a fiber and vegetable production process totally dependent on an appalling array of biocides. All these food production technologies, our main sources of sustenance, strain and, in some cases, break natural systems.

For example, the brown pelican now quietly soars toward extinction because man's handy biocides preclude the bird's successful reproduction, not because the waterfowler selected pelicans as a worthy quarry. Perhaps if the bird had been selected, its future options would be more promising. In Montana, sportsmen and the agency that represents them attacked use of these chlorinated hydrocarbon biocides on public land 20 years before the federal government banned them entirely—and we won! The victims at that time were whitefish and blue grouse. The beneficiaries were all living things.

In Montana, the land still yields a wild bounty for those who understand its presence and enjoy its flavor and variety. The harvest is there for the taking. Nature produces lavishly, asking only that her capacity to renew not be impaired.

Shortly after the spring thaw, the early growth of such things as mushrooms, wild asparagus, wild onion, lamb's quarter, cattail and watercress accent a meal of wild trout. In summer, berries ripen and are shared liberally by man and wild animals alike. Creatively they become cobblers, jams, syrup, jellies and wine. In autumn, the harvest turns to game animals and provides another dramatic illustration that nature's surpluses are always available when the habitat requirements of any species are met. Nature's gift now is meat—wholesome and free of diethylstilbestrol (D.E.S., a growth hormone),

with livers virtually free of man's chemical ingenuity, wild fowl free of stimulating hormones, antelope produced by sage (where the plant has escaped our herbicides) and venison high in protein and low in fat—meat to feed us as Lewis and Clark were fed in 1805 and the American Indian was fed for centuries before that.

Obviously, harvesting has been and is a compatible ingredient of the natural system. With many species it is not only compatible, but essential. Today, the harvest must be carefully regulated, and at the insistence of sportsmen, it is.

When contemplating the harvest of fish and game it must be recognized that animals live not only as individuals but also as members of a species. Nutritional needs of an individual animal can be measured in such things as pounds of meat or forage per day. An animal will live only if those nutritional requirements are met. Individual animals do survive in zoos—much as humans exist and reproduce in tenements.

But for an entire wild species to exist, it takes more than sustaining life in a single individual. It means maintaining the integrity of the total environment or habitat supporting an animal population. If this is done, nature will produce in great abundance. It is her way, in fact, to produce more individuals than the habitat can assimilate and sustain. Consequently, in all cases, a species can accommodate a harvest and, in some circumstances, it absolutely requires it.

No species presently being hunted is faced with extinction. To the contrary, many species of fish, wild fowl and game animals currently being hunted owe their existence to the symbiotic relationship between sportsmen and their quarry. Innumerable broods of waterfowl owe their existence to wetlands provided by waterfowl hunters who, in return, ask only the opportunity to sit numbed in the icy predawn darkness, anticipating southbound flights. They ask for the chance to extract a modest harvest from a population that would not exist but for the benevolence of the expectant gunners.

These same persons would be the first to know if the flights stopped coming, and history attests they are the only ones who really care enough to do something about it.

It's unfortunate brown pelicans were not selected by sportsmen as a game bird. If they had been, their chances for survival would be better. Of all the species of fish, game and fowl on earth, very few attain the status of "fair game." Obtaining this status for any species virtually insures its survival.—*Jim Posewitz*

Should we let it happen again?

September 22 marks the second National Hunting and Fishing Day. The first was a big success in Montana and across the nation, but what will happen this year?

Back in 1970, the first Earth Day was also a resounding success. But what has happened to that day since? It's been on a slow downward skid that probably reached its low point this year. The news media hardly mentioned, it at least compared to past years.

Will National Hunting and Fishing Day suffer the same fate? The day represents a meaningful and deserving celebration of the conservation contributions of the hunter and fisherman. These two groups have, throughout history, done more to promote wise management of fish, wildlife and other national resources than any other group. So, we think they should have their day.

But will their day continue as a bright spot each fall? Will public officials continue to honor it? Will an equal or more amount of public interest be generated this year? Or, will the downfall of Earth Day happen again?—*Bill Schneider*